

T

$$J = \frac{1}{2}$$

τ discovery paper was PERL 75. $e^+ e^- \rightarrow \tau^+ \tau^-$ cross-section threshold behavior and magnitude are consistent with pointlike spin-1/2 Dirac particle. BRANDELIK 78 ruled out pointlike spin-0 or spin-1 particle. FELDMAN 78 ruled out $J = 3/2$. KIRKBY 79 also ruled out $J=\text{integer}$, $J = 3/2$.

NODE=S035

NODE=S035

τ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1776.82±0.16 OUR AVERAGE				
1776.68±0.12±0.41	682k	¹ AUBERT	09AK BABR	$423 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$
$1776.81^{+0.25}_{-0.23} \pm 0.15$	81	ANASHIN	07 KEDR	$6.7 \text{ pb}^{-1}, E_{\text{cm}}^{\text{ee}}=3.54\text{--}3.78 \text{ GeV}$
1776.61±0.13±0.35		¹ BELOUS	07 BELL	$414 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$
$1775.1 \pm 1.6 \pm 1.0$	13.3k	² ABBIENDI	00A OPAL	1990–1995 LEP runs
1778.2 ± 0.8 ± 1.2		ANASTASSOV 97	CLEO	$E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$
$1776.96^{+0.18+0.25}_{-0.21-0.17}$	65	³ BAI	96 BES	$E_{\text{cm}}^{\text{ee}}=3.54\text{--}3.57 \text{ GeV}$
$1776.3 \pm 2.4 \pm 1.4$	11k	⁴ ALBRECHT	92M ARG	$E_{\text{cm}}^{\text{ee}}=9.4\text{--}10.6 \text{ GeV}$
1783 $^{+3}_{-4}$	692	⁵ BACINO	78B DLCO	$E_{\text{cm}}^{\text{ee}}=3.1\text{--}7.4 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1777.8 ± 0.7 ± 1.7	35k	⁶ BALEST	93 CLEO	Repl. by ANASTASSOV 97
$1776.9^{+0.4}_{-0.5} \pm 0.2$	14	⁷ BAI	92 BES	Repl. by BAI 96

NODE=S035M

NODE=S035M

- ¹AUBERT 09AK and BELOUS 07 fit τ pseudomass spectrum in $\tau \rightarrow \pi\pi^+\pi^-\nu_\tau$ decays. Result assumes $m_{\nu_\tau} = 0$.
- ²ABBIENDI 00A fit τ pseudomass spectrum in $\tau \rightarrow \pi^\pm \leq 2\pi^0\nu_\tau$ and $\tau \rightarrow \pi^\pm\pi^+\pi^- \leq 1\pi^0\nu_\tau$ decays. Result assumes $m_{\nu_\tau}=0$.
- ³BAI 96 fit $\sigma(e^+e^- \rightarrow \tau^+\tau^-)$ at different energies near threshold.
- ⁴ALBRECHT 92M fit τ pseudomass spectrum in $\tau^- \rightarrow 2\pi^-\pi^+\nu_\tau$ decays. Result assumes $m_{\nu_\tau}=0$.
- ⁵BACINO 78B value comes from $e^\pm X^\mp$ threshold. Published mass 1782 MeV increased by 1 MeV using the high precision $\psi(2S)$ mass measurement of ZHOLENTZ 80 to eliminate the absolute SPEAR energy calibration uncertainty.
- ⁶BALEST 93 fit spectra of minimum kinematically allowed τ mass in events of the type $e^+e^- \rightarrow \tau^+\tau^- \rightarrow (\pi^+n\pi^0\nu_\tau)(\pi^-m\pi^0\nu_\tau)$ $n \leq 2$, $m \leq 2$, $1 \leq n+m \leq 3$. If $m_{\nu_\tau} \neq 0$, result increases by $(m_{\nu_\tau}^2/1100 \text{ MeV})$.
- ⁷BAI 92 fit $\sigma(e^+e^- \rightarrow \tau^+\tau^-)$ near threshold using $e\mu$ events.

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NODE=S035M;LINKAGE=E

$(m_{\tau^+} - m_{\tau^-})/m_{\text{average}}$

A test of *CPT* invariance.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.8 \times 10^{-4}$	90	BELOUS	07 BELL	$414 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<5.5 \times 10^{-4}$	90	¹ AUBERT	09AK BABR	$423 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$
$<3.0 \times 10^{-3}$	90	ABBIENDI	00A OPAL	1990–1995 LEP runs

NODE=S035MDF

NODE=S035MDF

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NODE=S035MDF;LINKAGE=AU

τ MEAN LIFE

VALUE (10^{-15} s)	EVTS	DOCUMENT ID	TECN	COMMENT
290.6± 1.0 OUR AVERAGE				
290.9± 1.4± 1.0		ABDALLAH 04T	DLPH	1991–1995 LEP runs
293.2± 2.0± 1.5		ACCIARRI 00B	L3	1991–1995 LEP runs
290.1± 1.5± 1.1		BARATE 97R	ALEP	1989–1994 LEP runs
289.2± 1.7± 1.2		ALEXANDER 96E	OPAL	1990–1994 LEP runs
289.0± 2.8± 4.0	57.4k	BALEST 96	CLEO	$E_{\text{cm}}^{\text{ee}}=10.6 \text{ GeV}$

NODE=S035T

NODE=S035T

• • • We do not use the following data for averages, fits, limits, etc. • • •

291.2 ± 2.0 ± 1.2		BARATE	97I	ALEP	Repl. by BARATE 97R
291.4 ± 3.0		ABREU	96B	DLPH	Repl. by ABDAL- LAH 04T
290.1 ± 4.0	34k	ACCIARRI	96K	L3	Repl. by ACCIARRI 00B
297 ± 9 ± 5	1671	ABE	95Y	SLD	1992–1993 SLC runs
304 ± 14 ± 7	4100	BATTLE	92	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
301 ± 29	3780	KLEINWORT	89	JADE	$E_{\text{cm}}^{\text{ee}} = 35\text{--}46 \text{ GeV}$
288 ± 16 ± 17	807	AMIDEI	88	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
306 ± 20 ± 14	695	BRAUNSCH...	88C	TASS	$E_{\text{cm}}^{\text{ee}} = 36 \text{ GeV}$
299 ± 15 ± 10	1311	ABACHI	87C	HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
295 ± 14 ± 11	5696	ALBRECHT	87P	ARG	$E_{\text{cm}}^{\text{ee}} = 9.3\text{--}10.6 \text{ GeV}$
309 ± 17 ± 7	3788	BAND	87B	MAC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
325 ± 14 ± 18	8470	BEBEK	87C	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.5 \text{ GeV}$
460 ± 190	102	FELDMAN	82	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

τ MAGNETIC MOMENT ANOMALY

The q^2 dependence is expected to be small providing no thresholds are nearby.

$$\mu_\tau / (e\hbar/2m_\tau) - 1 = (g_\tau - 2)/2$$

For a theoretical calculation $[(g_\tau - 2)/2 = 117.721(5) \times 10^{-8}]$, see EIDELMAN 07.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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> -0.052 and < 0.013 (CL = 95%) OUR LIMIT

> -0.052 and < 0.013 95 ¹ ABDALLAH 04K DLPH $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.107	95	² ACHARD 04G L3	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
> -0.007 and < 0.005	95	³ GONZALEZ-S..00 RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ and $W \rightarrow \tau\nu_\tau$
> -0.052 and < 0.058	95	⁴ ACCIARRI 98E L3	1991–1995 LEP runs
> -0.068 and < 0.065	95	⁵ ACKERSTAFF 98N OPAL	1990–1995 LEP runs
> -0.004 and < 0.006	95	⁶ ESCRIBANO 97 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
<0.01	95	⁷ ESCRIBANO 93 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
<0.12	90	GRIFOLS 91 RVUE	$Z \rightarrow \tau\tau\gamma$ at LEP
<0.023	95	⁸ SILVERMAN 83 RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ at PETRA

¹ ABDALLAH 04K limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 183 and 208 GeV. In addition to the limits, the authors also quote a value of -0.018 ± 0.017 .

² ACHARD 04G limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 189 and 206 GeV, and is on the absolute value of the magnetic moment anomaly.

³ GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.

⁴ ACCIARRI 98E use $Z \rightarrow \tau^+\tau^-\gamma$ events. In addition to the limits, the authors also quote a value of $0.004 \pm 0.027 \pm 0.023$.

⁵ ACKERSTAFF 98N use $Z \rightarrow \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ's having p^2 ranging from m_τ^2 to $(M_Z - m_\tau)^2$.

⁶ ESCRIBANO 97 use preliminary experimental results.

⁷ ESCRIBANO 93 limit derived from $\Gamma(Z \rightarrow \tau^+\tau^-)$, and is on the absolute value of the magnetic moment anomaly.

⁸ SILVERMAN 83 limit is derived from $e^+e^- \rightarrow \tau^+\tau^-$ total cross-section measurements for q^2 up to $(37 \text{ GeV})^2$.

NODE=S035245

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NODE=S035MM

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NODE=S035MM → UNCHECKED ←

NODE=S035MM;LINKAGE=AB

NODE=S035MM;LINKAGE=AH

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NODE=S035MM;LINKAGE=C

NODE=S035MM;LINKAGE=A

NODE=S035MM;LINKAGE=B

NODE=S035240

NODE=S035240

NODE=S035EDM

NODE=S035EDM

τ ELECTRIC DIPOLE MOMENT (d_τ)

A nonzero value is forbidden by both T invariance and P invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

$$\text{Re}(d_\tau)$$

VALUE (10 ⁻¹⁶ ecm)	CL%	DOCUMENT ID	TECN	COMMENT
– 0.22 to 0.45	95	¹ INAMI	03	BELL $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 2.3	90	² GROZIN	09A	RVUE	From e EDM limit
< 3.7	95	³ ABDALLAH	04K	DLPH	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
< 11.4	95	⁴ ACHARD	04G	L3	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
< 4.6	95	⁵ ALBRECHT	00	ARG	$E_{cm}^{ee} = 10.4$ GeV
> -3.1 and < 3.1	95	ACCIARRI	98E	L3	1991–1995 LEP runs
> -3.8 and < 3.6	95	⁶ ACKERSTAFF	98N	OPAL	1990–1995 LEP runs
< 0.11	95	^{7,8} ESCRIBANO	97	RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
< 0.5	95	⁹ ESCRIBANO	93	RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
< 7	90	GRIFOLS	91	RVUE	$Z \rightarrow \tau\tau\gamma$ at LEP
< 1.6	90	DELAGUILA	90	RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ $E_{cm}^{ee} = 35$ GeV

¹ INAMI 03 use $e^+e^- \rightarrow \tau^+\tau^-$ events.

² GROZIN 09A calculate the contribution to the electron electric dipole moment from the τ electric dipole moment appearing in loops, which is $\Delta d_e = 6.9 \times 10^{-12} d_\tau$. Dividing the REGAN 02 upper limit $|d_e| \leq 1.6 \times 10^{-27}$ e cm at CL=90% by 6.9×10^{-12} gives this limit.

³ ABDALLAH 04K limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 183 and 208 GeV and is on the absolute value of d_τ .

⁴ ACHARD 04G limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 189 and 206 GeV, and is on the absolute value of d_τ .

⁵ ALBRECHT 00 use $e^+e^- \rightarrow \tau^+\tau^-$ events. Limit is on the absolute value of $Re(d_\tau)$.

⁶ ACKERSTAFF 98N use $Z \rightarrow \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ 's having p^2 ranging from m_τ^2 to $(M_Z-m_\tau)^2$.

⁷ ESCRIBANO 97 derive the relationship $|d_\tau| = \cot \theta_W |d_\tau^W|$ using effective Lagrangian methods, and use a conference result $|d_\tau^W| < 5.8 \times 10^{-18}$ e cm at 95% CL (L. Silvestris, ICHEP96) to obtain this result.

⁸ ESCRIBANO 97 use preliminary experimental results.

⁹ ESCRIBANO 93 limit derived from $\Gamma(Z \rightarrow \tau^+\tau^-)$, and is on the absolute value of the electric dipole moment.

Im(d_τ)

VALUE (10^{-16} e cm)	CL%	DOCUMENT ID	TECN	COMMENT
-0.25 to 0.08	95	¹ INAMI	03	BELL $E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 1.8	95	² ALBRECHT	00	ARG	$E_{cm}^{ee} = 10.4$ GeV
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¹ INAMI 03 use $e^+e^- \rightarrow \tau^+\tau^-$ events.

² ALBRECHT 00 use $e^+e^- \rightarrow \tau^+\tau^-$ events. Limit is on the absolute value of $Im(d_\tau)$.

τ WEAK DIPOLE MOMENT (d_τ^W)

A nonzero value is forbidden by CP invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(d_τ^W)

VALUE (10^{-17} e cm)	CL%	DOCUMENT ID	TECN	COMMENT
<0.50	95	¹ HEISTER	03F	ALEP 1990–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

<3.0	90	¹ ACCIARRI	98C	L3 1991–1995 LEP runs
<0.56	95	ACKERSTAFF	97L	OPAL 1991–1995 LEP runs
<0.78	95	² AKERS	95F	OPAL Repl. by ACKERSTAFF 97L
<1.5	95	² BUSKULIC	95C	ALEP Repl. by HEISTER 03F
<7.0	95	² ACTON	92F	OPAL $Z \rightarrow \tau^+\tau^-$ at LEP
<3.7	95	² BUSKULIC	92J	ALEP Repl. by BUSKULIC 95C

¹ Limit is on the absolute value of the real part of the weak dipole moment.

² Limit is on the absolute value of the real part of the weak dipole moment, and applies for $q^2 = m_Z^2$.

NODE=S035EDM;LINKAGE=IN
NODE=S035EDM;LINKAGE=GR

NODE=S035EDM;LINKAGE=AB

NODE=S035EDM;LINKAGE=AC

NODE=S035EDM;LINKAGE=AT

NODE=S035EDM;LINKAGE=NA

NODE=S035EDM;LINKAGE=B

NODE=S035EDM;LINKAGE=C

NODE=S035EDM;LINKAGE=A

NODE=S035EDI
NODE=S035EDI

NODE=S035EDI;LINKAGE=IN

NODE=S035EDI;LINKAGE=AT

NODE=S035242

NODE=S035242

NODE=S035WDM
NODE=S035WDM

NODE=S035WDM;LINKAGE=WA

NODE=S035WDM;LINKAGE=A

Im(d_τ^w)

VALUE (10^{-17} ecm)	CL%	DOCUMENT ID	TECN	COMMENT
<1.1	95	1 HEISTER 03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.5	95	ACKERSTAFF 97L	OPAL	1991–1995 LEP runs
<4.5	95	2 AKERS 95F	OPAL	Repl. by ACKERSTAFF 97L
1 HEISTER 03F limit is on the absolute value of the imaginary part of the weak dipole moment.				
2 Limit is on the absolute value of the imaginary part of the weak dipole moment, and applies for $q^2 = m_Z^2$.				

NODE=S035WDI
NODE=S035WDI

 τ WEAK ANOMALOUS MAGNETIC DIPOLE MOMENT (α_τ^w)

Electroweak radiative corrections are expected to contribute at the 10^{-6} level. See BERNABEU 95.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(α_τ^w)

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 1.1×10^{-3}	95	1 HEISTER 03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
> -0.0024 and < 0.0025	95	2 GONZALEZ-S...00	RVUE	$e^+ e^- \rightarrow \tau^+ \tau^-$ and $W \rightarrow \tau \nu_\tau$
< 4.5×10^{-3}	90	1 ACCIARRI 98C L3		1991–1995 LEP runs
1 Limit is on the absolute value of the real part of the weak anomalous magnetic dipole moment.				
2 GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.				

NODE=S035WMM
NODE=S035WMM

Im(α_τ^w)

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 2.7×10^{-3}	95	1 HEISTER 03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 9.9×10^{-3}	90	1 ACCIARRI 98C L3		1991–1995 LEP runs
1 Limit is on the absolute value of the imaginary part of the weak anomalous magnetic dipole moment.				

NODE=S035WMI
NODE=S035WMI

 τ^- DECAY MODES

τ^+ modes are charge conjugates of the modes below. “ h^\pm ” stands for π^\pm or K^\pm . “ ℓ ” stands for e or μ . “Neutrals” stands for γ 's and/or π^0 's.

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Modes with one charged particle		
Γ_1 particle $^- \geq 0$ neutrals $\geq 0 K^0 \nu_\tau$ ("1-prong")	(85.35 ± 0.07) %	S=1.3
Γ_2 particle $^- \geq 0$ neutrals $\geq 0 K_L^0 \nu_\tau$	(84.71 ± 0.08) %	S=1.3
Γ_3 $\mu^- \bar{\nu}_\mu \nu_\tau$	[a] (17.41 ± 0.04) %	S=1.1
Γ_4 $\mu^- \bar{\nu}_\mu \nu_\tau \gamma$	[b] (3.6 ± 0.4) $\times 10^{-3}$	
Γ_5 $e^- \bar{\nu}_e \nu_\tau$	[a] (17.83 ± 0.04) %	
Γ_6 $e^- \bar{\nu}_e \nu_\tau \gamma$	[b] (1.75 ± 0.18) %	
Γ_7 $h^- \geq 0 K_L^0 \nu_\tau$	(12.06 ± 0.06) %	S=1.2
Γ_8 $h^- \nu_\tau$	(11.53 ± 0.06) %	S=1.2
Γ_9 $\pi^- \nu_\tau$	[a] (10.83 ± 0.06) %	S=1.2
Γ_{10} $K^- \nu_\tau$	[a] (7.00 ± 0.10) $\times 10^{-3}$	S=1.1
Γ_{11} $h^- \geq 1$ neutrals ν_τ	(37.10 ± 0.10) %	S=1.2
Γ_{12} $h^- \geq 1 \pi^0 \nu_\tau$ (ex. K^0)	(36.58 ± 0.10) %	S=1.2
Γ_{13} $h^- \pi^0 \nu_\tau$	(25.95 ± 0.09) %	S=1.1
Γ_{14} $\pi^- \pi^0 \nu_\tau$	[a] (25.52 ± 0.09) %	S=1.1
Γ_{15} $\pi^- \pi^0$ non- $\rho(770) \nu_\tau$	(3.0 ± 3.2) $\times 10^{-3}$	DESIG=24

NODE=S035;CLUMP=B
DESIG=219

DESIG=191

DESIG=1

DESIG=76

DESIG=2

DESIG=274

DESIG=181

DESIG=217

DESIG=12

DESIG=7

DESIG=192

DESIG=299

DESIG=171

DESIG=16

DESIG=24

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NODE=S035243

NODE=S035243

NODE=S035WMM
NODE=S035WMM

NODE=S035WMM;LINKAGE=WA

NODE=S035WMM;LINKAGE=GS

NODE=S035WMI
NODE=S035WMI

NODE=S035WMI;LINKAGE=WA

NODE=S035215;NODE=S035

NODE=S035

Γ_{16}	$K^- \pi^0 \nu_\tau$	[a]	$(4.29 \pm 0.15) \times 10^{-3}$	DESIG=182
Γ_{17}	$h^- \geq 2\pi^0 \nu_\tau$		$(10.87 \pm 0.11) \%$	S=1.2 DESIG=19
Γ_{18}	$h^- 2\pi^0 \nu_\tau$		$(9.52 \pm 0.11) \%$	S=1.1 DESIG=218
Γ_{19}	$h^- 2\pi^0 \nu_\tau (\text{ex. } K^0)$		$(9.36 \pm 0.11) \%$	S=1.2 DESIG=27
Γ_{20}	$\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0)$	[a]	$(9.30 \pm 0.11) \%$	S=1.2 DESIG=201
Γ_{21}	$\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0),$ scalar		$< 9 \times 10^{-3}$	CL=95% DESIG=282
Γ_{22}	$\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0),$ vector		$< 7 \times 10^{-3}$	CL=95% DESIG=283
Γ_{23}	$K^- 2\pi^0 \nu_\tau (\text{ex. } K^0)$	[a]	$(6.5 \pm 2.3) \times 10^{-4}$	DESIG=115
Γ_{24}	$h^- \geq 3\pi^0 \nu_\tau$		$(1.35 \pm 0.07) \%$	S=1.1 DESIG=79
Γ_{25}	$h^- \geq 3\pi^0 \nu_\tau (\text{ex. } K^0)$		$(1.26 \pm 0.07) \%$	S=1.1 DESIG=300
Γ_{26}	$h^- 3\pi^0 \nu_\tau$		$(1.19 \pm 0.07) \%$	DESIG=26
Γ_{27}	$\pi^- 3\pi^0 \nu_\tau (\text{ex. } K^0)$	[a]	$(1.05 \pm 0.07) \%$	DESIG=203
Γ_{28}	$K^- 3\pi^0 \nu_\tau (\text{ex. } K^0, \eta)$	[a]	$(4.8 \pm 2.2) \times 10^{-4}$	DESIG=116
Γ_{29}	$h^- 4\pi^0 \nu_\tau (\text{ex. } K^0)$		$(1.6 \pm 0.4) \times 10^{-3}$	DESIG=220
Γ_{30}	$h^- 4\pi^0 \nu_\tau (\text{ex. } K^0, \eta)$	[a]	$(1.1 \pm 0.4) \times 10^{-3}$	DESIG=110
Γ_{31}	$K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau$		$(1.572 \pm 0.033) \%$	S=1.1 DESIG=198
Γ_{32}	$K^- \geq 1 (\pi^0 \text{ or } K^0 \text{ or } \gamma) \nu_\tau$		$(8.72 \pm 0.32) \times 10^{-3}$	S=1.1 DESIG=11
Modes with K^0's				
Γ_{33}	$K_S^0 (\text{particles})^- \nu_\tau$		$(9.2 \pm 0.4) \times 10^{-3}$	NODE=S035;CLUMP=F DESIG=127
Γ_{34}	$h^- \bar{K}^0 \nu_\tau$		$(1.00 \pm 0.05) \%$	S=1.8 DESIG=212
Γ_{35}	$\pi^- \bar{K}^0 \nu_\tau$	[a]	$(8.4 \pm 0.4) \times 10^{-3}$	S=2.1 DESIG=117
Γ_{36}	$\pi^- \bar{K}^0 (\text{non-}K^*(892)^-) \nu_\tau$		$(5.4 \pm 2.1) \times 10^{-4}$	DESIG=142
Γ_{37}	$K^- K^0 \nu_\tau$	[a]	$(1.59 \pm 0.16) \times 10^{-3}$	DESIG=62
Γ_{38}	$K^- K^0 \geq 0\pi^0 \nu_\tau$		$(3.18 \pm 0.23) \times 10^{-3}$	DESIG=273
Γ_{39}	$h^- \bar{K}^0 \pi^0 \nu_\tau$		$(5.6 \pm 0.4) \times 10^{-3}$	DESIG=213
Γ_{40}	$\pi^- \bar{K}^0 \pi^0 \nu_\tau$	[a]	$(4.0 \pm 0.4) \times 10^{-3}$	DESIG=118
Γ_{41}	$\bar{K}^0 \rho^- \nu_\tau$		$(2.2 \pm 0.5) \times 10^{-3}$	DESIG=249
Γ_{42}	$K^- K^0 \pi^0 \nu_\tau$	[a]	$(1.59 \pm 0.20) \times 10^{-3}$	DESIG=119
Γ_{43}	$\pi^- \bar{K}^0 \geq 1\pi^0 \nu_\tau$		$(3.2 \pm 1.0) \times 10^{-3}$	DESIG=272
Γ_{44}	$\pi^- \bar{K}^0 \pi^0 \pi^0 \nu_\tau$		$(2.6 \pm 2.4) \times 10^{-4}$	DESIG=238
Γ_{45}	$K^- K^0 \pi^0 \pi^0 \nu_\tau$		$< 1.6 \times 10^{-4}$	CL=95% DESIG=239
Γ_{46}	$\pi^- K^0 \bar{K}^0 \nu_\tau$		$(1.7 \pm 0.4) \times 10^{-3}$	S=1.8 DESIG=141
Γ_{47}	$\pi^- K_S^0 K_S^0 \nu_\tau$	[a]	$(2.31 \pm 0.17) \times 10^{-4}$	S=1.9 DESIG=214
Γ_{48}	$\pi^- K_S^0 K_L^0 \nu_\tau$	[a]	$(1.2 \pm 0.4) \times 10^{-3}$	S=1.8 DESIG=240
Γ_{49}	$\pi^- K^0 \bar{K}^0 \pi^0 \nu_\tau$		$(3.1 \pm 2.3) \times 10^{-4}$	DESIG=278
Γ_{50}	$\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau$		$(1.60 \pm 0.30) \times 10^{-4}$	DESIG=241
Γ_{51}	$\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau$		$(3.1 \pm 1.2) \times 10^{-4}$	DESIG=242
Γ_{52}	$K^- K_S^0 K_S^0 \nu_\tau$		$< 6.3 \times 10^{-7}$	CL=90% DESIG=332
Γ_{53}	$K^- K_S^0 K_L^0 \pi^0 \nu_\tau$		$< 4.0 \times 10^{-7}$	CL=90% DESIG=333
Γ_{54}	$K^0 h^+ h^- \geq 0 \text{ neutrals } \nu_\tau$		$< 1.7 \times 10^{-3}$	CL=95% DESIG=29
Γ_{55}	$K^0 h^+ h^- h^- \nu_\tau$		$(2.3 \pm 2.0) \times 10^{-4}$	DESIG=244
Modes with three charged particles				
Γ_{56}	$h^- h^- h^+ \geq 0 \text{ neutrals } \geq 0 K_L^0 \nu_\tau$		$(15.20 \pm 0.08) \%$	NODE=S035;CLUMP=C DESIG=194
Γ_{57}	$h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau$ (ex. $K_S^0 \rightarrow \pi^+ \pi^-$) ("3-prong")		$(14.57 \pm 0.07) \%$	S=1.3 DESIG=209
Γ_{58}	$h^- h^- h^+ \nu_\tau$		$(9.80 \pm 0.07) \%$	S=1.2 DESIG=17
Γ_{59}	$h^- h^- h^+ \nu_\tau (\text{ex. } K^0)$		$(9.46 \pm 0.06) \%$	S=1.2 DESIG=208
Γ_{60}	$h^- h^- h^+ \nu_\tau (\text{ex. } K^0, \omega)$		$(9.42 \pm 0.06) \%$	S=1.2 DESIG=215
Γ_{61}	$\pi^- \pi^+ \pi^- \nu_\tau$		$(9.31 \pm 0.06) \%$	S=1.2 DESIG=257
Γ_{62}	$\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)$		$(9.02 \pm 0.06) \%$	S=1.1 DESIG=258
Γ_{63}	$\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0),$ non-axial vector		$< 2.4 \%$	CL=95% DESIG=284
Γ_{64}	$\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0, \omega)$	[a]	$(8.99 \pm 0.06) \%$	S=1.1 DESIG=259
Γ_{65}	$h^- h^- h^+ \geq 1 \text{ neutrals } \nu_\tau$		$(5.39 \pm 0.07) \%$	S=1.2 DESIG=18
Γ_{66}	$h^- h^- h^+ \geq 1 \pi^0 \nu_\tau (\text{ex. } K^0)$		$(5.09 \pm 0.06) \%$	S=1.2 DESIG=222
Γ_{67}	$h^- h^- h^+ \pi^0 \nu_\tau$		$(4.76 \pm 0.06) \%$	S=1.2 DESIG=25
Γ_{68}	$h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0)$		$(4.57 \pm 0.06) \%$	S=1.2 DESIG=143

Γ_{69}	$h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0, ω)	(2.79 \pm 0.08) %	S=1.2	DESIG=202
Γ_{70}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$	(4.62 \pm 0.06) %	S=1.2	DESIG=261
Γ_{71}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)	(4.48 \pm 0.06) %	S=1.2	DESIG=262
Γ_{72}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, ω)	[a] (2.70 \pm 0.08) %	S=1.2	DESIG=263
Γ_{73}	$h^- \rho \pi^0 \nu_\tau$			DESIG=91
Γ_{74}	$h^- \rho^+ h^- \nu_\tau$			DESIG=92
Γ_{75}	$h^- \rho^- h^+ \nu_\tau$			DESIG=93
Γ_{76}	$h^- h^- h^+ \geq 2\pi^0 \nu_\tau$ (ex. K^0)	(5.21 \pm 0.32) $\times 10^{-3}$		DESIG=301
Γ_{77}	$h^- h^- h^+ 2\pi^0 \nu_\tau$	(5.08 \pm 0.32) $\times 10^{-3}$		DESIG=221
Γ_{78}	$h^- h^- h^+ 2\pi^0 \nu_\tau$ (ex. K^0)	(4.98 \pm 0.32) $\times 10^{-3}$		DESIG=112
Γ_{79}	$h^- h^- h^+ 2\pi^0 \nu_\tau$ (ex. K^0, ω, η)	[a] (1.0 \pm 0.4) $\times 10^{-3}$		DESIG=216
Γ_{80}	$h^- h^- h^+ 3\pi^0 \nu_\tau$	[a] (2.3 \pm 0.6) $\times 10^{-4}$	S=1.2	DESIG=204
Γ_{81}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex. K^0)	(2.1 \pm 0.4) $\times 10^{-4}$		DESIG=318
Γ_{82}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex. $K^0, \eta, f_1(1285)$)	(1.7 \pm 0.4) $\times 10^{-4}$		DESIG=319
Γ_{83}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex. $K^0, \eta, \omega, f_1(1285)$)	< 5.8 $\times 10^{-5}$	CL=90%	DESIG=320
Γ_{84}	$K^- h^+ h^- \geq 0$ neutrals ν_τ	(6.35 \pm 0.24) $\times 10^{-3}$	S=1.5	DESIG=28
Γ_{85}	$K^- h^+ \pi^- \nu_\tau$ (ex. K^0)	(4.38 \pm 0.19) $\times 10^{-3}$	S=2.7	DESIG=270
Γ_{86}	$K^- h^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)	(8.7 \pm 1.2) $\times 10^{-4}$	S=1.1	DESIG=271
Γ_{87}	$K^- \pi^+ \pi^- \geq 0$ neutrals ν_τ	(4.85 \pm 0.21) $\times 10^{-3}$	S=1.4	DESIG=6
Γ_{88}	$K^- \pi^+ \pi^- \geq 0 \pi^0 \nu_\tau$ (ex. K^0)	(3.75 \pm 0.19) $\times 10^{-3}$	S=1.5	DESIG=275
Γ_{89}	$K^- \pi^+ \pi^- \nu_\tau$	(3.49 \pm 0.16) $\times 10^{-3}$	S=1.9	DESIG=245
Γ_{90}	$K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0)	[a] (2.94 \pm 0.15) $\times 10^{-3}$	S=2.2	DESIG=260
Γ_{91}	$K^- \rho^0 \nu_\tau \rightarrow K^- \pi^+ \pi^- \nu_\tau$	(1.4 \pm 0.5) $\times 10^{-3}$		DESIG=286
Γ_{92}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$	(1.35 \pm 0.14) $\times 10^{-3}$		DESIG=246
Γ_{93}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)	(8.1 \pm 1.2) $\times 10^{-4}$		DESIG=264
Γ_{94}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, η)	[a] (7.8 \pm 1.2) $\times 10^{-4}$		DESIG=285
Γ_{95}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, ω)	(3.7 \pm 0.9) $\times 10^{-4}$		DESIG=294
Γ_{96}	$K^- \pi^+ K^- \geq 0$ neut. ν_τ	< 9 $\times 10^{-4}$	CL=95%	DESIG=123
Γ_{97}	$K^- K^+ \pi^- \geq 0$ neut. ν_τ	(1.50 \pm 0.06) $\times 10^{-3}$	S=1.8	DESIG=122
Γ_{98}	$K^- K^+ \pi^- \nu_\tau$	[a] (1.44 \pm 0.05) $\times 10^{-3}$	S=1.9	DESIG=5
Γ_{99}	$K^- K^+ \pi^- \pi^0 \nu_\tau$	[a] (6.1 \pm 2.5) $\times 10^{-5}$	S=1.4	DESIG=247
Γ_{100}	$K^- K^+ K^- \nu_\tau$	(2.1 \pm 0.8) $\times 10^{-5}$	S=5.4	DESIG=248
Γ_{101}	$K^- K^+ K^- \nu_\tau$ (ex. ϕ)	< 2.5 $\times 10^{-6}$	CL=90%	DESIG=303
Γ_{102}	$K^- K^+ K^- \pi^0 \nu_\tau$	< 4.8 $\times 10^{-6}$	CL=90%	DESIG=296
Γ_{103}	$\pi^- K^+ \pi^- \geq 0$ neut. ν_τ	< 2.5 $\times 10^{-3}$	CL=95%	DESIG=121
Γ_{104}	$e^- e^- e^+ \bar{\nu}_e \nu_\tau$	(2.8 \pm 1.5) $\times 10^{-5}$		DESIG=210
Γ_{105}	$\mu^- e^- e^+ \bar{\nu}_\mu \nu_\tau$	< 3.6 $\times 10^{-5}$	CL=90%	DESIG=211

Modes with five charged particles

Γ_{106}	$3h^- 2h^+ \geq 0$ neutrals ν_τ (ex. $K_S^0 \rightarrow \pi^- \pi^+$) ("5-prong")	(1.02 \pm 0.04) $\times 10^{-3}$	S=1.1	NODE=S035;CLUMP=D DESIG=20
Γ_{107}	$3h^- 2h^+ \nu_\tau$ (ex. K^0)	[a] (8.39 \pm 0.35) $\times 10^{-4}$	S=1.1	DESIG=3
Γ_{108}	$3\pi^- 2\pi^+ \nu_\tau$ (ex. K^0, ω)	(8.3 \pm 0.4) $\times 10^{-4}$		DESIG=321
Γ_{109}	$3\pi^- 2\pi^+ \nu_\tau$ (ex. $K^0, \omega, f_1(1285)$)	(7.7 \pm 0.4) $\times 10^{-4}$		DESIG=322
Γ_{110}	$K^- 2\pi^- 2\pi^+ \nu_\tau$	< 2.4 $\times 10^{-6}$	CL=90%	DESIG=327
Γ_{111}	$K^+ 3\pi^- \pi^+ \nu_\tau$	< 5.0 $\times 10^{-6}$	CL=90%	DESIG=328
Γ_{112}	$K^+ K^- 2\pi^- \pi^+ \nu_\tau$	< 4.5 $\times 10^{-7}$	CL=90%	DESIG=329
Γ_{113}	$3h^- 2h^+ \pi^0 \nu_\tau$ (ex. K^0)	[a] (1.78 \pm 0.27) $\times 10^{-4}$		DESIG=4
Γ_{114}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex. K^0)	(1.65 \pm 0.10) $\times 10^{-4}$		DESIG=323
Γ_{115}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex. $K^0, \eta, f_1(1285)$)	(1.11 \pm 0.10) $\times 10^{-4}$		DESIG=324
Γ_{116}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex. $K^0, \eta, \omega, f_1(1285)$)	(3.6 \pm 0.9) $\times 10^{-5}$		DESIG=325
Γ_{117}	$K^- 2\pi^- 2\pi^+ \pi^0 \nu_\tau$	< 1.9 $\times 10^{-6}$	CL=90%	DESIG=330
Γ_{118}	$K^+ 3\pi^- \pi^+ \pi^0 \nu_\tau$	< 8 $\times 10^{-7}$	CL=90%	DESIG=331
Γ_{119}	$3h^- 2h^+ 2\pi^0 \nu_\tau$	< 3.4 $\times 10^{-6}$	CL=90%	DESIG=128

Miscellaneous other allowed modes

Γ_{120}	$(5\pi)^-\nu_\tau$	$(7.6 \pm 0.5) \times 10^{-3}$		NODE=S035;CLUMP=E
Γ_{121}	$4h^-3h^+ \geq 0$ neutrals ν_τ ("7-prong")	$< 3.0 \times 10^{-7}$	CL=90%	DESIG=129 DESIG=61
Γ_{122}	$4h^-3h^+\nu_\tau^0$	$< 4.3 \times 10^{-7}$	CL=90%	DESIG=290
Γ_{123}	$4h^-3h^+\pi^0\nu_\tau$	$< 2.5 \times 10^{-7}$	CL=90%	DESIG=291
Γ_{124}	$X^-(S=-1)\nu_\tau$	$(2.87 \pm 0.07) \%$	S=1.3	DESIG=281
Γ_{125}	$K^*(892)^- \geq 0$ neutrals $\geq 0K_L^0\nu_\tau$	$(1.42 \pm 0.18) \%$	S=1.4	DESIG=23
Γ_{126}	$K^*(892)^-\nu_\tau$	$(1.20 \pm 0.07) \%$	S=1.8	DESIG=21
Γ_{127}	$K^*(892)^-\nu_\tau \rightarrow \pi^-\bar{K}^0\nu_\tau$	$(7.9 \pm 0.5) \times 10^{-3}$		DESIG=304
Γ_{128}	$K^*(892)^0K^- \geq 0$ neutrals ν_τ	$(3.2 \pm 1.4) \times 10^{-3}$		DESIG=97
Γ_{129}	$K^*(892)^0K^-\nu_\tau$	$(2.1 \pm 0.4) \times 10^{-3}$		DESIG=206
Γ_{130}	$\bar{K}^*(892)^0\pi^- \geq 0$ neutrals ν_τ	$(3.8 \pm 1.7) \times 10^{-3}$		DESIG=98
Γ_{131}	$\bar{K}^*(892)^0\pi^-\nu_\tau$	$(2.2 \pm 0.5) \times 10^{-3}$		DESIG=205
Γ_{132}	$(\bar{K}^*(892)\pi)^-\nu_\tau \rightarrow \pi^-\bar{K}^0\pi^0\nu_\tau$	$(1.0 \pm 0.4) \times 10^{-3}$		DESIG=250
Γ_{133}	$K_1(1270)^-\nu_\tau$	$(4.7 \pm 1.1) \times 10^{-3}$		DESIG=125
Γ_{134}	$K_1(1400)^-\nu_\tau$	$(1.7 \pm 2.6) \times 10^{-3}$	S=1.7	DESIG=126
Γ_{135}	$K^*(1410)^-\nu_\tau$	$(1.5 \pm 1.4) \times 10^{-3}$		DESIG=279
Γ_{136}	$K_0^*(1430)^-\nu_\tau$	$< 5 \times 10^{-4}$	CL=95%	DESIG=280
Γ_{137}	$K_2^*(1430)^-\nu_\tau$	$< 3 \times 10^{-3}$	CL=95%	DESIG=22
Γ_{138}	$a_0(980)^- \geq 0$ neutrals ν_τ			DESIG=99
Γ_{139}	$\eta\pi^-\nu_\tau$	$< 9.9 \times 10^{-5}$	CL=95%	DESIG=14
Γ_{140}	$\eta\pi^-\pi^0\nu_\tau$	[a] $(1.39 \pm 0.10) \times 10^{-3}$	S=1.4	DESIG=58
Γ_{141}	$\eta\pi^-\pi^0\pi^0\nu_\tau$	$(1.81 \pm 0.31) \times 10^{-4}$		DESIG=68
Γ_{142}	$\eta K^-\nu_\tau$	[a] $(1.52 \pm 0.08) \times 10^{-4}$		DESIG=109
Γ_{143}	$\eta K^*(892)^-\nu_\tau$	$(1.38 \pm 0.15) \times 10^{-4}$		DESIG=265
Γ_{144}	$\eta K^-\pi^0\nu_\tau$	$(4.8 \pm 1.2) \times 10^{-5}$		DESIG=266
Γ_{145}	$\eta K^-\pi^0(\text{non-}K^*(892))\nu_\tau$	$< 3.5 \times 10^{-5}$	CL=90%	DESIG=309
Γ_{146}	$\eta\bar{K}^0\pi^-\nu_\tau$	$(9.3 \pm 1.5) \times 10^{-5}$		DESIG=267
Γ_{147}	$\eta\bar{K}^0\pi^-\pi^0\nu_\tau$	$< 5.0 \times 10^{-5}$	CL=90%	DESIG=310
Γ_{148}	$\eta K^-K^0\nu_\tau$	$< 9.0 \times 10^{-6}$	CL=90%	DESIG=311
Γ_{149}	$\eta\pi^+\pi^-\pi^- \geq 0$ neutrals ν_τ	$< 3 \times 10^{-3}$	CL=90%	DESIG=66
Γ_{150}	$\eta\pi^-\pi^+\pi^-\nu_\tau (\text{ex. } K^0)$	$(2.25 \pm 0.13) \times 10^{-4}$		DESIG=230
Γ_{151}	$\eta\pi^-\pi^+\pi^-\nu_\tau (\text{ex. } K^0, f_1(1285))$	$(9.9 \pm 1.6) \times 10^{-5}$		DESIG=314
Γ_{152}	$\eta a_1(1260)^-\nu_\tau \rightarrow \eta\pi^-\rho^0\nu_\tau$	$< 3.9 \times 10^{-4}$	CL=90%	DESIG=231
Γ_{153}	$\eta\eta\pi^-\nu_\tau$	$< 7.4 \times 10^{-6}$	CL=90%	DESIG=69
Γ_{154}	$\eta\eta\pi^-\pi^0\nu_\tau$	$< 2.0 \times 10^{-4}$	CL=95%	DESIG=70
Γ_{155}	$\eta\eta K^-\nu_\tau$	$< 3.0 \times 10^{-6}$	CL=90%	DESIG=312
Γ_{156}	$\eta'(958)\pi^-\nu_\tau$	$< 4.0 \times 10^{-6}$	CL=90%	DESIG=232
Γ_{157}	$\eta'(958)\pi^-\pi^0\nu_\tau$	$< 1.2 \times 10^{-5}$	CL=90%	DESIG=233
Γ_{158}	$\eta'(958)K^-\nu_\tau$	$< 2.4 \times 10^{-6}$	CL=90%	DESIG=326
Γ_{159}	$\phi\pi^-\nu_\tau$	$(3.4 \pm 0.6) \times 10^{-5}$		DESIG=207
Γ_{160}	$\phi K^-\nu_\tau$	$(3.70 \pm 0.33) \times 10^{-5}$	S=1.3	DESIG=223
Γ_{161}	$f_1(1285)\pi^-\nu_\tau$	$(3.9 \pm 0.5) \times 10^{-4}$	S=1.9	DESIG=234
Γ_{162}	$f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau$	$(1.18 \pm 0.07) \times 10^{-4}$	S=1.3	DESIG=235
Γ_{163}	$f_1(1285)\pi^-\nu_\tau \rightarrow 3\pi^-2\pi^+\nu_\tau$	$(5.2 \pm 0.5) \times 10^{-5}$		DESIG=315
Γ_{164}	$\pi(1300)^-\nu_\tau \rightarrow (\rho\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau$	$< 1.0 \times 10^{-4}$	CL=90%	DESIG=276
Γ_{165}	$\pi(1300)^-\nu_\tau \rightarrow ((\pi\pi)_{S\text{-wave}}\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau$	$< 1.9 \times 10^{-4}$	CL=90%	DESIG=277
Γ_{166}	$h^-\omega \geq 0$ neutrals ν_τ	$(2.41 \pm 0.09) \%$	S=1.2	DESIG=71
Γ_{167}	$h^-\omega\nu_\tau$	[a] $(2.00 \pm 0.08) \%$	S=1.3	DESIG=8
Γ_{168}	$K^-\omega\nu_\tau$	$(4.1 \pm 0.9) \times 10^{-4}$		DESIG=295
Γ_{169}	$h^-\omega\pi^0\nu_\tau$	[a] $(4.1 \pm 0.4) \times 10^{-3}$		DESIG=113
Γ_{170}	$h^-\omega 2\pi^0\nu_\tau$	$(1.4 \pm 0.5) \times 10^{-4}$		DESIG=237
Γ_{171}	$\pi^-\omega 2\pi^0\nu_\tau$	$(7.3 \pm 1.7) \times 10^{-5}$		DESIG=317
Γ_{172}	$h^-2\omega\nu_\tau$	$< 5.4 \times 10^{-7}$	CL=90%	DESIG=302
Γ_{173}	$2h^-h^+\omega\nu_\tau$	$(1.20 \pm 0.22) \times 10^{-4}$		DESIG=287
Γ_{174}	$2\pi^-\pi^+\omega\nu_\tau$	$(8.4 \pm 0.7) \times 10^{-5}$		DESIG=316

**Lepton Family number (*LF*), Lepton number (*L*),
or Baryon number (*B*) violating modes**

NODE=S035;CLUMP=A

L means lepton number violation (e.g. $\tau^- \rightarrow e^+ \pi^- \pi^-$). Following common usage, *LF* means lepton family violation *and not* lepton number violation (e.g. $\tau^- \rightarrow e^- \pi^+ \pi^-$). *B* means baryon number violation.

NODE=S035

Γ_{175}	$e^- \gamma$	<i>LF</i>	< 3.3	$\times 10^{-8}$	CL=90%	DESIG=32
Γ_{176}	$\mu^- \gamma$	<i>LF</i>	< 4.4	$\times 10^{-8}$	CL=90%	DESIG=31
Γ_{177}	$e^- \pi^0$	<i>LF</i>	< 8.0	$\times 10^{-8}$	CL=90%	DESIG=40
Γ_{178}	$\mu^- \pi^0$	<i>LF</i>	< 1.1	$\times 10^{-7}$	CL=90%	DESIG=39
Γ_{179}	$e^- K_S^0$	<i>LF</i>	< 2.6	$\times 10^{-8}$	CL=90%	DESIG=42
Γ_{180}	$\mu^- K_S^0$	<i>LF</i>	< 2.3	$\times 10^{-8}$	CL=90%	DESIG=41
Γ_{181}	$e^- \eta$	<i>LF</i>	< 9.2	$\times 10^{-8}$	CL=90%	DESIG=67
Γ_{182}	$\mu^- \eta$	<i>LF</i>	< 6.5	$\times 10^{-8}$	CL=90%	DESIG=114
Γ_{183}	$e^- \rho^0$	<i>LF</i>	< 1.8	$\times 10^{-8}$	CL=90%	DESIG=44
Γ_{184}	$\mu^- \rho^0$	<i>LF</i>	< 1.2	$\times 10^{-8}$	CL=90%	DESIG=43
Γ_{185}	$e^- \omega$	<i>LF</i>	< 4.8	$\times 10^{-8}$	CL=90%	DESIG=305
Γ_{186}	$\mu^- \omega$	<i>LF</i>	< 4.7	$\times 10^{-8}$	CL=90%	DESIG=306
Γ_{187}	$e^- K^*(892)^0$	<i>LF</i>	< 3.2	$\times 10^{-8}$	CL=90%	DESIG=53
Γ_{188}	$\mu^- K^*(892)^0$	<i>LF</i>	< 5.9	$\times 10^{-8}$	CL=90%	DESIG=54
Γ_{189}	$e^- \bar{K}^*(892)^0$	<i>LF</i>	< 3.4	$\times 10^{-8}$	CL=90%	DESIG=131
Γ_{190}	$\mu^- \bar{K}^*(892)^0$	<i>LF</i>	< 7.0	$\times 10^{-8}$	CL=90%	DESIG=132
Γ_{191}	$e^- \eta'(958)$	<i>LF</i>	< 1.6	$\times 10^{-7}$	CL=90%	DESIG=292
Γ_{192}	$\mu^- \eta'(958)$	<i>LF</i>	< 1.3	$\times 10^{-7}$	CL=90%	DESIG=293
Γ_{193}	$e^- f_0(980) \rightarrow e^- \pi^+ \pi^-$	<i>LF</i>	< 3.2	$\times 10^{-8}$	CL=90%	DESIG=307
Γ_{194}	$\mu^- f_0(980) \rightarrow \mu^- \pi^+ \pi^-$	<i>LF</i>	< 3.4	$\times 10^{-8}$	CL=90%	DESIG=308
Γ_{195}	$e^- \phi$	<i>LF</i>	< 3.1	$\times 10^{-8}$	CL=90%	DESIG=255
Γ_{196}	$\mu^- \phi$	<i>LF</i>	< 8.4	$\times 10^{-8}$	CL=90%	DESIG=256
Γ_{197}	$e^- e^+ e^-$	<i>LF</i>	< 2.7	$\times 10^{-8}$	CL=90%	DESIG=38
Γ_{198}	$e^- \mu^+ \mu^-$	<i>LF</i>	< 2.7	$\times 10^{-8}$	CL=90%	DESIG=36
Γ_{199}	$e^+ \mu^- \mu^-$	<i>LF</i>	< 1.7	$\times 10^{-8}$	CL=90%	DESIG=55
Γ_{200}	$\mu^- e^+ e^-$	<i>LF</i>	< 1.8	$\times 10^{-8}$	CL=90%	DESIG=37
Γ_{201}	$\mu^+ e^- e^-$	<i>LF</i>	< 1.5	$\times 10^{-8}$	CL=90%	DESIG=56
Γ_{202}	$\mu^- \mu^+ \mu^-$	<i>LF</i>	< 2.1	$\times 10^{-8}$	CL=90%	DESIG=35
Γ_{203}	$e^- \pi^+ \pi^-$	<i>LF</i>	< 2.3	$\times 10^{-8}$	CL=90%	DESIG=45
Γ_{204}	$e^+ \pi^- \pi^-$	<i>L</i>	< 2.0	$\times 10^{-8}$	CL=90%	DESIG=46
Γ_{205}	$\mu^- \pi^+ \pi^-$	<i>LF</i>	< 2.1	$\times 10^{-8}$	CL=90%	DESIG=47
Γ_{206}	$\mu^+ \pi^- \pi^-$	<i>L</i>	< 3.9	$\times 10^{-8}$	CL=90%	DESIG=48
Γ_{207}	$e^- \pi^+ K^-$	<i>LF</i>	< 3.7	$\times 10^{-8}$	CL=90%	DESIG=49
Γ_{208}	$e^- \pi^- K^+$	<i>LF</i>	< 3.1	$\times 10^{-8}$	CL=90%	DESIG=77
Γ_{209}	$e^+ \pi^- K^-$	<i>L</i>	< 3.2	$\times 10^{-8}$	CL=90%	DESIG=50
Γ_{210}	$e^- K_S^0 K_S^0$	<i>LF</i>	< 7.1	$\times 10^{-8}$	CL=90%	DESIG=288
Γ_{211}	$e^- K^+ K^-$	<i>LF</i>	< 3.4	$\times 10^{-8}$	CL=90%	DESIG=251
Γ_{212}	$e^+ K^- K^-$	<i>L</i>	< 3.3	$\times 10^{-8}$	CL=90%	DESIG=252
Γ_{213}	$\mu^- \pi^+ K^-$	<i>LF</i>	< 8.6	$\times 10^{-8}$	CL=90%	DESIG=51
Γ_{214}	$\mu^- \pi^- K^+$	<i>LF</i>	< 4.5	$\times 10^{-8}$	CL=90%	DESIG=78
Γ_{215}	$\mu^+ \pi^- K^-$	<i>L</i>	< 4.8	$\times 10^{-8}$	CL=90%	DESIG=52
Γ_{216}	$\mu^- K_S^0 K_S^0$	<i>LF</i>	< 8.0	$\times 10^{-8}$	CL=90%	DESIG=289
Γ_{217}	$\mu^- K^+ K^-$	<i>LF</i>	< 4.4	$\times 10^{-8}$	CL=90%	DESIG=253
Γ_{218}	$\mu^+ K^- K^-$	<i>L</i>	< 4.7	$\times 10^{-8}$	CL=90%	DESIG=254
Γ_{219}	$e^- \pi^0 \pi^0$	<i>LF</i>	< 6.5	$\times 10^{-6}$	CL=90%	DESIG=224
Γ_{220}	$\mu^- \pi^0 \pi^0$	<i>LF</i>	< 1.4	$\times 10^{-5}$	CL=90%	DESIG=225
Γ_{221}	$e^- \eta \eta$	<i>LF</i>	< 3.5	$\times 10^{-5}$	CL=90%	DESIG=226
Γ_{222}	$\mu^- \eta \eta$	<i>LF</i>	< 6.0	$\times 10^{-5}$	CL=90%	DESIG=227
Γ_{223}	$e^- \pi^0 \eta$	<i>LF</i>	< 2.4	$\times 10^{-5}$	CL=90%	DESIG=228
Γ_{224}	$\mu^- \pi^0 \eta$	<i>LF</i>	< 2.2	$\times 10^{-5}$	CL=90%	DESIG=229
Γ_{225}	$\bar{p} \gamma$	<i>L,B</i>	< 3.5	$\times 10^{-6}$	CL=90%	DESIG=104
Γ_{226}	$\bar{p} \pi^0$	<i>L,B</i>	< 1.5	$\times 10^{-5}$	CL=90%	DESIG=105
Γ_{227}	$\bar{p} 2\pi^0$	<i>L,B</i>	< 3.3	$\times 10^{-5}$	CL=90%	DESIG=268
Γ_{228}	$\bar{p} \eta$	<i>L,B</i>	< 8.9	$\times 10^{-6}$	CL=90%	DESIG=106
Γ_{229}	$\bar{p} \pi^0 \eta$	<i>L,B</i>	< 2.7	$\times 10^{-5}$	CL=90%	DESIG=269
Γ_{230}	$\Lambda \pi^-$	<i>L,B</i>	< 7.2	$\times 10^{-8}$	CL=90%	DESIG=297
Γ_{231}	$\bar{\Lambda} \pi^-$	<i>L,B</i>	< 1.4	$\times 10^{-7}$	CL=90%	DESIG=298
Γ_{232}	$e^- \text{light boson}$	<i>LF</i>	< 2.7	$\times 10^{-3}$	CL=95%	DESIG=102
Γ_{233}	$\mu^- \text{light boson}$	<i>LF</i>	< 5	$\times 10^{-3}$	CL=95%	DESIG=103

- [a] Basis mode for the τ .
 - [b] See the Particle Listings below for the energy limits used in this measurement.

LINKAGE=BB

LINKAGE=KDM

CONSTRAINED FIT INFORMATION

An overall fit to 66 branching ratios uses 139 measurements and one constraint to determine 31 parameters. The overall fit has a $\chi^2 = 128.9$ for 109 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x35	-1
x37	0 -3
x40	0 -10 0
x42	0 -2 -17 -18
x47	0 -1 0 0 0
x48	-1 -24 -7 -18 -5 -1
x64	-7 -1 -1 -1 0 0 -1
x72	3 3 1 3 0 0 2 -11
x79	3 -1 0 -1 0 0 -1 -2 -7
x80	-1 0 0 0 0 0 0 0 -1 -1
x90	-2 -2 0 -1 0 0 -2 10 -3 -1
x94	-1 -1 0 -1 0 0 -1 -2 -7 -1
x98	-2 -2 0 -1 0 0 -1 9 -3 -1
x99	0 0 0 0 0 0 0 0 -1 0
x107	0 -2 0 -2 0 0 -2 -3 -2 1
x113	-1 0 0 0 0 0 0 -2 -1 1
x140	-3 -1 0 -1 0 0 -1 0 0 -7
x142	0 0 0 0 0 0 0 0 0 0
x167	1 0 0 0 0 0 0 -7 -69 -4
x169	3 -3 0 -2 0 0 -2 -3 -9 -62
	x30 x35 x37 x40 x42 x47 x48 x64 x72 x79
x90	0
x94	-1 -2
x98	0 76 -1
x99	0 0 -3 0
x107	0 -2 -1 -2 0
x113	0 -1 0 -1 0 -5
x140	0 0 0 0 0 0 0
x142	0 0 -2 0 0 0 0 0
x167	-1 -2 3 -2 1 -1 -1 0 0
x169	-2 -2 -2 -2 0 1 1 -1 0 -5
	x80 x90 x94 x98 x99 x107 x113 x140 x142 x167

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$(\Gamma(\tau^+) - \Gamma(\tau^-)) / (\Gamma(\tau^+) + \Gamma(\tau^-))$	
$\tau^\pm \rightarrow \pi^\pm K_S^0 \nu_\tau$ (RATE DIFFERENCE) / (RATE SUM)	
VALUE (%)	DOCUMENT ID
-0.36±0.23±0.11	LEES 12M BABR 476 fb ⁻¹ $E_{cm}^{ee} = 10.6$ GeV

τ^- BRANCHING RATIOS

$$\Gamma(\text{particle}^- \geq 0 \text{ neutrals} \geq 0 K^0 \nu_\tau \text{ ("1-prong")}) / \Gamma_{\text{total}} \quad \Gamma_1 / \Gamma$$

$$\Gamma_1 / \Gamma = (\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10} + \Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + \Gamma_{35} + \Gamma_{37} + \Gamma_{40} + \Gamma_{42} + 2\Gamma_{47} + \Gamma_{48} + 0.708\Gamma_{140} + 0.715\Gamma_{142} + 0.09\Gamma_{167} + 0.09\Gamma_{169}) / \Gamma$$

The charged particle here can be e , μ , or hadron. In many analyses, the sum of the topological branching fractions (1, 3, and 5 prongs) is constrained to be unity. Since the 5-prong fraction is very small, the measured 1-prong and 3-prong fractions are highly correlated and cannot be treated as independent quantities in our overall fit. We arbitrarily choose to use the 3-prong fraction in our fit, and leave the 1-prong fraction out. We do, however, use these 1-prong measurements in our average below. The measurements used only for the average are marked “avg,” whereas “f&a” marks a result used for the fit and the average.

NODE=S035215

NODE=S035250

NODE=S035DR1

NODE=S035DR1

NODE=S035220

NODE=S035220

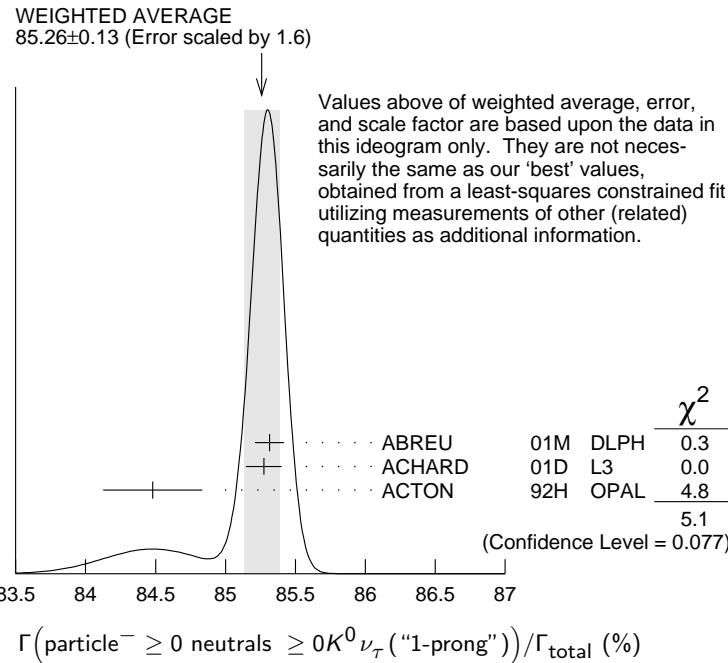
NODE=S035B75

NODE=S035B75

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
85.35 ±0.07 OUR FIT				Error includes scale factor of 1.3.
85.26 ±0.13 OUR AVERAGE				Error includes scale factor of 1.6. See the ideogram below.
• • • We use the following data for averages but not for fits. • • •				
85.316±0.093±0.049	78k	1 ABREU	01M DLPH	1992–1995 LEP runs
85.274±0.105±0.073		2 ACHARD	01D L3	1992–1995 LEP runs
84.48 ±0.27 ±0.23		ACTON	92H OPAL	1990–1991 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
85.45 $\begin{array}{l} +0.69 \\ -0.73 \end{array}$ ±0.65		DECAMP	92C ALEP	Repl. by SCHAEFEL 05C

NODE=S035B75

1 The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau \rightarrow \text{3-prong})$ and $B(\tau \rightarrow \text{5-prong})$ are -0.98 and -0.08 respectively.
 2 The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau \rightarrow \text{"3-prong"})$ and $B(\tau \rightarrow \text{"5-prong"})$ are -0.978 and -0.082 respectively.

NOTFITTED
NOTFITTED
NOTFITTED

$$\Gamma_2/\Gamma = (\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10} + \Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.6569\Gamma_{35} + 0.6569\Gamma_{37} + 0.6569\Gamma_{40} + 0.6569\Gamma_{42} + 1.0985\Gamma_{47} + 0.3139\Gamma_{48} + 0.708\Gamma_{140} + 0.715\Gamma_{142} + 0.09\Gamma_{167} + 0.09\Gamma_{169})/\Gamma$$

NODE=S035R24
NODE=S035R24

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
84.71±0.08 OUR FIT				Error includes scale factor of 1.3.
85.1 ±0.4 OUR AVERAGE				

NODE=S035R24

• • • We use the following data for averages but not for fits. • • •				
85.6 ±0.6 ±0.3	3300	1 ADEVA	91F L3	$E_{\text{cm}}^{\text{ee}} = 88.3\text{--}94.3 \text{ GeV}$
84.9 ±0.4 ±0.3		BEHREND	89B CELL	$E_{\text{cm}}^{\text{ee}} = 14\text{--}47 \text{ GeV}$
84.7 ±0.8 ±0.6		2 AIHARA	87B TPC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
86.4 ±0.3 ±0.3		ABACHI	89B HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
87.1 ±1.0 ±0.7		3 BURCHAT	87 MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
87.2 ±0.5 ±0.8		SCHMIDKE	86 MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
84.7 ±1.1 $\begin{array}{l} +1.6 \\ -1.3 \end{array}$	169	4 ALTHOFF	85 TASS	$E_{\text{cm}}^{\text{ee}} = 34.5 \text{ GeV}$
86.1 ±0.5 ±0.9		BARTEL	85F JADE	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$
87.8 ±1.3 ±3.9		5 BERGER	85 PLUT	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$
86.7 ±0.3 ±0.6		FERNANDEZ	85 MAC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

NOTFITTED
NOTFITTED
NOTFITTED

- ¹ Not independent of ADEVA 91F $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ value.
- ² Not independent of AIHARA 87B $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(h^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ values.
- ³ Not independent of SCHMIDKE 86 value (also not independent of BURCHAT 87 value for $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$).
- ⁴ Not independent of ALTHOFF 85 $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(h^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ values.
- ⁵ Not independent of (1-prong + 0 π^0) and (1-prong + $\geq 1\pi^0$) values.

$\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$

Γ_3/Γ

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

VALUE (%)	EVTs	DOCUMENT ID	TECN	COMMENT
17.41 ± 0.04 OUR FIT		Error includes scale factor of 1.1.		
17.33 ± 0.05 OUR AVERAGE				
17.319 ± 0.070 ± 0.032	54k	¹ SCHAEL	05C ALEP	1991-1995 LEP runs
17.34 ± 0.09 ± 0.06	31.4k	ABBIENDI	03 OPAL	1990-1995 LEP runs
17.342 ± 0.110 ± 0.067	21.5k	² ACCIARRI	01F L3	1991-1995 LEP runs
17.325 ± 0.095 ± 0.077	27.7k	ABREU	99X DLPH	1991-1995 LEP runs
• • • We use the following data for averages but not for fits. • • •				
17.37 ± 0.08 ± 0.18		³ ANASTASSOV 97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
17.31 ± 0.11 ± 0.05	20.7k	BUSKULIC	96C ALEP	Repl. by SCHAEL 05C
17.02 ± 0.19 ± 0.24	6586	ABREU	95T DLPH	Repl. by ABREU 99X
17.36 ± 0.27	7941	AKERS	95I OPAL	Repl. by ABBIENDI 03
17.6 ± 0.4 ± 0.4	2148	ADRIANI	93M L3	Repl. by ACCIARRI 01F
17.4 ± 0.3 ± 0.5		⁴ ALBRECHT	93G ARG $E_{\text{cm}}^{\text{ee}} = 9.4-10.6 \text{ GeV}$	
17.35 ± 0.41 ± 0.37		DECAMP	92C ALEP	1989-1990 LEP runs
17.7 ± 0.8 ± 0.4	568	BEHREND	90 CELL $E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$	
17.4 ± 1.0	2197	ADEVA	88 MRKJ $E_{\text{cm}}^{\text{ee}} = 14-16 \text{ GeV}$	
17.7 ± 1.2 ± 0.7		AIHARA	87B TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
18.3 ± 0.9 ± 0.8		BURCHAT	87 MRK2 $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
18.6 ± 0.8 ± 0.7	558	⁵ BARTEL	86D JADE $E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$	
12.9 ± 1.7 ± 0.5		ALTHOFF	85 TASS $E_{\text{cm}}^{\text{ee}} = 34.5 \text{ GeV}$	
18.0 ± 0.9 ± 0.5	473	⁵ ASH	85B MAC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
18.0 ± 1.0 ± 0.6		⁶ BALTRUSAIT..85	MRK3 $E_{\text{cm}}^{\text{ee}} = 3.77 \text{ GeV}$	
19.4 ± 1.6 ± 1.7	153	BERGER	85 PLUT $E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$	
17.6 ± 2.6 ± 2.1	47	BEHREND	83C CELL $E_{\text{cm}}^{\text{ee}} = 34 \text{ GeV}$	
17.8 ± 2.0 ± 1.8		BERGER	81B PLUT $E_{\text{cm}}^{\text{ee}} = 9-32 \text{ GeV}$	

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² The correlation coefficient between this measurement and the ACCIARRI 01F measurement of $B(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ is 0.08.

³ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(e\bar{\nu}_e \nu_\tau)$, $B(\mu\bar{\nu}_\mu \nu_\tau)/B(e\bar{\nu}_e \nu_\tau)$, $B(h^- \nu_\tau)$, and $B(h^- \nu_\tau)/B(e\bar{\nu}_e \nu_\tau)$ are 0.50, 0.58, 0.50, and 0.08 respectively.

⁴ Not independent of ALBRECHT 92D $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) \times \Gamma(e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}^2$ values.

⁵ Modified using $B(e^- \bar{\nu}_e \nu_\tau)/B(\text{"1 prong"})$ and $B(\text{"1 prong"}) = 0.855$.

⁶ Error correlated with BALTRUSAIT 85 $e\nu\bar{\nu}$ value.

NODE=S035R24;LINKAGE=A

NODE=S035R24;LINKAGE=L

NODE=S035R24;LINKAGE=K

NODE=S035R24;LINKAGE=F

NODE=S035R24;LINKAGE=G

NODE=S035R1

NODE=S035R1

NODE=S035R1

NOTFITTED

NOTFITTED

NOTFITTED

NODE=S035R1;LINKAGE=SC

NODE=S035R1;LINKAGE=FA

NODE=S035R1;LINKAGE=N1

NODE=S035R1;LINKAGE=BB

NODE=S035R1;LINKAGE=Q

NODE=S035R1;LINKAGE=H

NODE=S035B81

NODE=S035B81

NODE=S035B81;LINKAGE=C

NODE=S035B81;LINKAGE=A

NODE=S035B81;LINKAGE=B

$\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau \gamma)/\Gamma_{\text{total}}$

Γ_4/Γ

VALUE (%)	EVTs	DOCUMENT ID	TECN	COMMENT
0.361 ± 0.016 ± 0.035		¹ BERGFELD 00	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.30 ± 0.04 ± 0.05	116	² ALEXANDER 96S	OPAL	1991-1994 LEP runs
0.23 ± 0.10	10	³ WU	90 MRK2 $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
¹ BERGFELD 00 impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma^* > 10 \text{ MeV}$. For $E_\gamma^* > 20 \text{ MeV}$, they quote $(3.04 \pm 0.14 \pm 0.30) \times 10^{-3}$.				
² ALEXANDER 96S impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma > 20 \text{ MeV}$.				
³ WU 90 reports $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau \gamma)/\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) = 0.013 \pm 0.006$, which is converted to $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau \gamma)/\Gamma_{\text{total}}$ using $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau \gamma)/\Gamma_{\text{total}} = 17.35\%$. Requirements on detected γ 's correspond to a τ rest frame energy cutoff $E_\gamma > 37 \text{ MeV}$.				

$\Gamma(e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$ Γ_5/Γ

NODE=S035R2

NODE=S035R2

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
17.83 ± 0.04 OUR FIT					NODE=S035R2
17.82 ± 0.05 OUR AVERAGE					
17.837 ± 0.072 ± 0.036	56k	¹ SCHAEL	05C ALEP	1991–1995 LEP runs	
17.806 ± 0.104 ± 0.076	24.7k	² ACCIARRI	01F L3	1991–1995 LEP runs	
17.81 ± 0.09 ± 0.06	33.1k	ABBIENDI	99H OPAL	1991–1995 LEP runs	
17.877 ± 0.109 ± 0.110	23.3k	ABREU	99X DLPH	1991–1995 LEP runs	
17.76 ± 0.06 ± 0.17		³ ANASTASSOV	97 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
17.78 ± 0.10 ± 0.09	25.3k	ALEXANDER	96D OPAL	Repl. by ABBIENDI 99H	
17.79 ± 0.12 ± 0.06	20.6k	BUSKULIC	96C ALEP	Repl. by SCHAEL 05C	
17.51 ± 0.23 ± 0.31	5059	ABREU	95T DLPH	Repl.. by ABREU 99X	
17.9 ± 0.4 ± 0.4	2892	ADRIANI	93M L3	Repl. by ACCIARRI 01F	
17.5 ± 0.3 ± 0.5		⁴ ALBRECHT	93G ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$	
17.97 ± 0.14 ± 0.23	3970	AKERIB	92 CLEO	Repl. by ANASTASSOV 97	
19.1 ± 0.4 ± 0.6	2960	⁵ AMMAR	92 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.5\text{--}10.9 \text{ GeV}$	NOTFITTED
18.09 ± 0.45 ± 0.45		DECAMP	92C ALEP	Repl. by SCHAEL 05C	
17.0 ± 0.5 ± 0.6	1.7k	ABACHI	90 HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
18.4 ± 0.8 ± 0.4	644	BEHREND	90 CELL	$E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$	
16.3 ± 0.3 ± 3.2		JANSSEN	89 CBAL	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$	
18.4 ± 1.2 ± 1.0		AIHARA	87B TPC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
19.1 ± 0.8 ± 1.1		BURCHAT	87 MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	
16.8 ± 0.7 ± 0.9	515	⁵ BARTEL	86D JADE	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$	NOTFITTED
20.4 ± 3.0 ± 1.4		ALTHOFF	85 TASS	$E_{\text{cm}}^{\text{ee}} = 34.5 \text{ GeV}$	
17.8 ± 0.9 ± 0.6	390	⁵ ASH	85B MAC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$	NOTFITTED
18.2 ± 0.7 ± 0.5		⁶ BALTRUSAIT..85	MRK3	$E_{\text{cm}}^{\text{ee}} = 3.77 \text{ GeV}$	
13.0 ± 1.9 ± 2.9		BERGER	85 PLUT	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$	
18.3 ± 2.4 ± 1.9	60	BEHREND	83C CELL	$E_{\text{cm}}^{\text{ee}} = 34 \text{ GeV}$	
16.0 ± 1.3	459	⁷ BACINO	78B DLCO	$E_{\text{cm}}^{\text{ee}} = 3.1\text{--}7.4 \text{ GeV}$	

¹ Correlation matrix for SCHAEL 05C branching fractions, in percent:

NODE=S035R2;LINKAGE=SC

- (1) $\Gamma(\tau^- \rightarrow e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow \mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow \pi^-\nu_\tau)/\Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow \pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$
- (5) $\Gamma(\tau^- \rightarrow \pi^-\pi^0\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (6) $\Gamma(\tau^- \rightarrow \pi^-\pi^0\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (7) $\Gamma(\tau^- \rightarrow h^-4\pi^0\nu_\tau (\text{ex. } K^0,\eta))/\Gamma_{\text{total}}$
- (8) $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau (\text{ex. } K^0,\omega))/\Gamma_{\text{total}}$
- (9) $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\pi^0\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (10) $\Gamma(\tau^- \rightarrow h^-h^-h^+2\pi^0\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (11) $\Gamma(\tau^- \rightarrow h^-h^-h^+3\pi^0\nu_\tau)/\Gamma_{\text{total}}$
- (12) $\Gamma(\tau^- \rightarrow 3h^-2h^+\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (13) $\Gamma(\tau^- \rightarrow 3h^-2h^+\pi^0\nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(2)	-20											
(3)	-9	-6										
(4)	-16	-12	2									
(5)	-5	-5	-17	-37								
(6)	0	-4	-15	2	-27							
(7)	-2	-4	-24	-15	20	-47						
(8)	-14	-9	15	-5	-17	-14	-8					
(9)	-13	-12	-25	-30	4	-2	16	-15				
(10)	0	-2	-23	-14	4	10	13	-6	-17			
(11)	1	0	-5	1	4	6	0	-9	-2	-11		
(12)	0	1	9	4	-8	-4	-6	9	-5	-4	-2	
(13)	1	-4	-3	-5	3	2	-4	-3	-1	4	1	-24

² The correlation coefficient between this measurement and the ACCIARRI 01F measurement of $B(\tau^- \rightarrow \mu^-\bar{\nu}_\mu\nu_\tau)$ is 0.08.

NODE=S035R2;LINKAGE=FA

- ³The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu^-\bar{\nu}_\mu\nu_\tau)$, $B(\mu^-\bar{\nu}_\mu\nu_\tau)/B(e^-\bar{\nu}_e\nu_\tau)$, $B(h^-\nu_\tau)$, and $B(h^-\nu_\tau)/B(e^-\bar{\nu}_e\nu_\tau)$ are 0.50, -0.42, 0.48, and -0.39 respectively.
- ⁴Not independent of ALBRECHT 92D $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma(e^-\bar{\nu}_e\nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau) \times \Gamma(e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}^2$ values.
- ⁵Modified using $B(e^-\bar{\nu}_e\nu_\tau)/B(\text{"1 prong"})$ and $B(\text{"1 prong"})$, = 0.855.
- ⁶Error correlated with BALTRUSAITIS 85 $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma_{\text{total}}$.
- ⁷BACINO 78B value comes from fit to events with e^\pm and one other nonelectron charged prong.

$\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma(e^-\bar{\nu}_e\nu_\tau)$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.9764 ± 0.0030 OUR FIT				Error includes scale factor of 1.1.
0.979 ± 0.004 OUR AVERAGE				

0.9796 ± 0.0016 ± 0.0036	731k	¹ AUBERT	10F	BABR 467 fb ⁻¹ $E_{\text{cm}}^{\text{ee}} = 10.6$ GeV
0.9777 ± 0.0063 ± 0.0087		² ANASTASSOV 97	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6$ GeV
0.997 ± 0.035 ± 0.040		ALBRECHT	92D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV

¹Correlation matrix for AUBERT 10F branching fractions:

- (1) $\Gamma(\tau^- \rightarrow \mu^-\bar{\nu}_\mu\nu_\tau) / \Gamma(\tau^- \rightarrow e^-\bar{\nu}_e\nu_\tau)$
- (2) $\Gamma(\tau^- \rightarrow \pi^-\nu_\tau) / \Gamma(\tau^- \rightarrow e^-\bar{\nu}_e\nu_\tau)$
- (3) $\Gamma(\tau^- \rightarrow K^-\nu_\tau) / \Gamma(\tau^- \rightarrow e^-\bar{\nu}_e\nu_\tau)$

(1)	(2)
(2)	0.25
(3)	0.12 0.33

²The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu^-\bar{\nu}_\mu\nu_\tau)$, $B(e^-\bar{\nu}_e\nu_\tau)$, $B(h^-\nu_\tau)$, and $B(h^-\nu_\tau)/B(e^-\bar{\nu}_e\nu_\tau)$ are 0.58, -0.42, 0.07, and 0.45 respectively.

$\Gamma(e^-\bar{\nu}_e\nu_\tau\gamma)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.75 ± 0.06 ± 0.17		¹ BERGFELD	00	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6$ GeV

¹BERGFELD 00 impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma^* > 10$ MeV.

$\Gamma(h^- \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$

$\Gamma_7/\Gamma = (\Gamma_9 + \Gamma_{10} + \frac{1}{2}\Gamma_{35} + \frac{1}{2}\Gamma_{37} + \Gamma_{47})/\Gamma$				
12.06 ± 0.06 OUR FIT				Error includes scale factor of 1.2.

12.2 ± 0.4 OUR AVERAGE

12.47 ± 0.26 ± 0.43	2967	¹ ACCIARRI	95	L3 1992 LEP run
12.4 ± 0.7 ± 0.7	283	² ABREU	92N	DLPH 1990 LEP run
12.1 ± 0.7 ± 0.5	309	ALEXANDER	91D	OPAL 1990 LEP run

• • • We use the following data for averages but not for fits. • • •

11.3 ± 0.5 ± 0.8	798	³ FORD	87	MAC $E_{\text{cm}}^{\text{ee}} = 29$ GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

12.44 ± 0.11 ± 0.11	15k	⁴ BUSKULIC	96	ALEP Repl. by SCHAEEL 05C
11.7 ± 0.6 ± 0.8		⁵ ALBRECHT	92D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV
12.98 ± 0.44 ± 0.33		⁶ DECAMP	92C	ALEP Repl. by SCHAEEL 05C
12.3 ± 0.9 ± 0.5	1338	BEHREND	90	CELL $E_{\text{cm}}^{\text{ee}} = 35$ GeV
11.1 ± 1.1 ± 1.4		⁷ BURCHAT	87	MRK2 $E_{\text{cm}}^{\text{ee}} = 29$ GeV
12.3 ± 0.6 ± 1.1	328	⁸ BARTEL	86D	JADE $E_{\text{cm}}^{\text{ee}} = 34.6$ GeV
13.0 ± 2.0 ± 4.0		BERGER	85	PLUT $E_{\text{cm}}^{\text{ee}} = 34.6$ GeV
11.2 ± 1.7 ± 1.2	34	⁹ BEHREND	83C	CELL $E_{\text{cm}}^{\text{ee}} = 34$ GeV

¹ACCIARRI 95 with 0.65% added to remove their correction for $\pi^- K_L^0$ backgrounds.

²ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

³FORD 87 result for $B(\pi^-\nu_\tau)$ with 0.67% added to remove their K^- correction and adjusted for 1992 B("1 prong").

⁴BUSKULIC 96 quote $11.78 \pm 0.11 \pm 0.13$ We add 0.66 to undo their correction for unseen K_L^0 and modify the systematic error accordingly.

⁵Not independent of ALBRECHT 92D $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma(e^-\bar{\nu}_e\nu_\tau)$, $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau) \times \Gamma(e^-\bar{\nu}_e\nu_\tau)$, and $\Gamma(h^- \geq 0 K_L^0 \nu_\tau)/\Gamma(e^-\bar{\nu}_e\nu_\tau)$ values.

NODE=S035R2;LINKAGE=N1

NODE=S035R2;LINKAGE=BB

NODE=S035R2;LINKAGE=Q

NODE=S035R2;LINKAGE=H

NODE=S035R2;LINKAGE=B

NODE=S035R5

NODE=S035R5

NODE=S035R5

NODE=S035R5;LINKAGE=AU

NODE=S035R5;LINKAGE=N1

NODE=S035C39

NODE=S035C39

NODE=S035C39;LINKAGE=C

NODE=S035R43

NODE=S035R43

NODE=S035R43

NOTFITTED

NODE=S035R43;LINKAGE=C

NODE=S035R43;LINKAGE=E

NODE=S035R43;LINKAGE=B

NODE=S035R43;LINKAGE=F

NODE=S035R43;LINKAGE=BB

- ⁶ DECAMP 92C quote $B(h^- \geq 0 K_L^0 \geq 0 (K_S^0 \rightarrow \pi^+ \pi^-) \nu_\tau) = 13.32 \pm 0.44 \pm 0.33$. We subtract 0.35 to correct for their inclusion of the K_S^0 decays.
- ⁷ BURCHAT 87 with 1.1% added to remove their correction for K^- and $K^*(892)^-$ backgrounds.
- ⁸ BARTEL 86D result for $B(\pi^- \nu_\tau)$ with 0.59% added to remove their K^- correction and adjusted for 1992 B ("1 prong").
- ⁹ BEHREND 83C quote $B(\pi^- \nu_\tau) = 9.9 \pm 1.7 \pm 1.3$ after subtracting 1.3 ± 0.5 to correct for $B(K^- \nu_\tau)$.

$\Gamma(h^- \nu_\tau)/\Gamma_{\text{total}}$	$\Gamma_8/\Gamma = (\Gamma_9 + \Gamma_{10})/\Gamma$			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT

11.53 ± 0.06 OUR FIT Error includes scale factor of 1.2.

11.63 ± 0.12 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.

$11.571 \pm 0.120 \pm 0.114$	19k	¹ ABDALLAH 06A DLPH	1992–1995 LEP runs
$11.98 \pm 0.13 \pm 0.16$		ACKERSTAFF 98M OPAL	1991–1995 LEP runs
$11.52 \pm 0.05 \pm 0.12$		² ANASTASSOV 97 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ Correlation matrix for ABDALLAH 06A branching fractions, in percent:

- (1) $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow h^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow h^- \geq 1 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow h^- 2 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (5) $\Gamma(\tau^- \rightarrow h^- \geq 3 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (6) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (7) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (8) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \geq 1 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (9) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \geq 2 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (10) $\Gamma(\tau^- \rightarrow 3 h^- 2 h^+ \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$
- (11) $\Gamma(\tau^- \rightarrow 3 h^- 2 h^+ \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(2)	-34									
(3)	-47	56								
(4)	6	-66	15							
(5)	-6	38	11	-86						
(6)	-7	-8	15	0	-2					
(7)	-2	-1	-5	-3	3	-53				
(8)	-4	-4	-13	-4	-2	-56	75			
(9)	-1	-1	-4	3	-6	26	-78	-16		
(10)	-1	-1	1	0	0	-2	-3	-1	3	
(11)	0	0	0	0	0	1	0	-5	5	-57

² The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(e \bar{\nu}_e \nu_\tau)$, $B(\mu \bar{\nu}_\mu \nu_\tau)/B(e \bar{\nu}_e \nu_\tau)$, and $B(h^- \nu_\tau)/B(e \bar{\nu}_e \nu_\tau)$ are 0.50, 0.48, 0.07, and 0.63 respectively.

NODE=S035R43;LINKAGE=Q

NODE=S035R43;LINKAGE=A

NODE=S035R43;LINKAGE=D

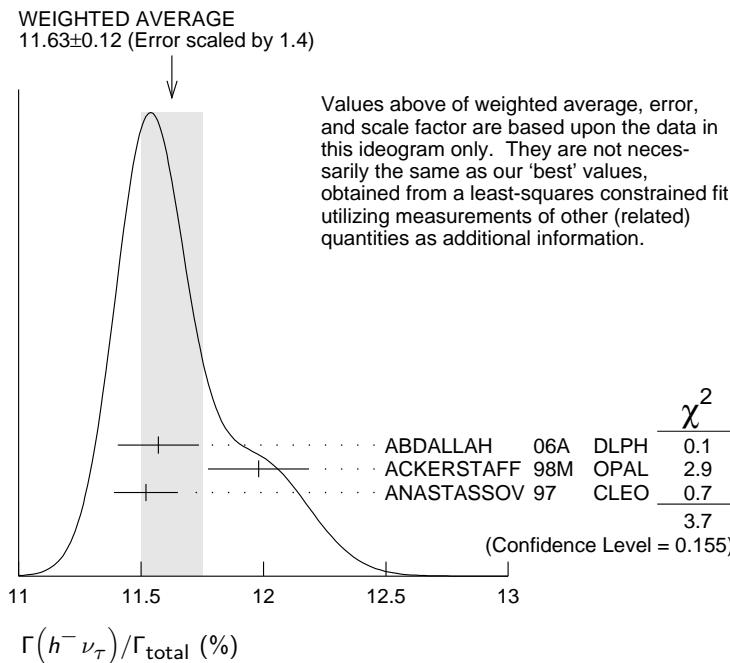
NODE=S035R43;LINKAGE=Q1

NODE=S035B73

NODE=S035B73

NODE=S035B73;LINKAGE=SC

NODE=S035B73;LINKAGE=N1



$\Gamma(h^- \nu_\tau) / \Gamma(e^- \bar{\nu}_e \nu_\tau)$	$\Gamma_8 / \Gamma_5 = (\Gamma_9 + \Gamma_{10}) / \Gamma_5$			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.647 ±0.004 OUR FIT	Error includes scale factor of 1.1.			
0.640 ±0.007 OUR AVERAGE	Error includes scale factor of 1.6.			

• • • We use the following data for averages but not for fits. • • •

0.6333±0.0014±0.0061	394k	¹ AUBERT	10F BABR	467 fb ⁻¹ E_{cm}^{ee} =10.6 GeV
0.6484±0.0041±0.0060		² ANASTASSOV 97	CLEO	E_{cm}^{ee} =10.6 GeV

¹ Not independent of AUBERT 10F $\Gamma(\tau^- \rightarrow \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ and $\Gamma(\tau^- \rightarrow K^- \nu_\tau) / \Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$.

² The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(e \bar{\nu}_e \nu_\tau)$, $B(\mu \bar{\nu}_\mu \nu_\tau) / B(e \bar{\nu}_e \nu_\tau)$, and $B(h^- \nu_\tau)$ are 0.08, -0.39, 0.45, and 0.63 respectively.

$\Gamma(\pi^- \nu_\tau) / \Gamma_{total}$	Γ_9 / Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
10.83 ±0.06 OUR FIT	Error includes scale factor of 1.2.			

10.828±0.070±0.078	38k	¹ SCHAEL	05C ALEP	1991-1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				

11.06 ±0.11 ±0.14		² BUSKULIC	96 ALEP	Repl. by SCHAEL 05C
11.7 ±0.4 ±1.8	1138	BLOCKER	82D MRK2	E_{cm}^{ee} =3.5–6.7 GeV

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{total}$ measurement for correlations with other measurements.

² Not independent of BUSKULIC 96 $B(h^- \nu_\tau)$ and $B(K^- \nu_\tau)$ values.

$\Gamma(\pi^- \nu_\tau) / \Gamma(e^- \bar{\nu}_e \nu_\tau)$	Γ_9 / Γ_5			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.607 ±0.004 OUR FIT	Error includes scale factor of 1.1.			

0.5945±0.0014±0.0061	369k	¹ AUBERT	10F BABR	467 fb ⁻¹ E_{cm}^{ee} =10.6 GeV
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¹ See footnote to AUBERT 10F $\Gamma(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ for correlations with other measurements.

$\Gamma(K^- \nu_\tau) / \Gamma_{total}$	Γ_{10} / Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.700±0.010 OUR FIT	Error includes scale factor of 1.1.			

0.685±0.023 OUR AVERAGE

0.658±0.027±0.029		¹ ABBIENDI	01J OPAL	1990–1995 LEP runs
0.696±0.025±0.014	2032	BARATE	99K ALEP	1991–1995 LEP runs
0.85 ±0.18	27	ABREU	94K DLPH	LEP 1992 Z data
0.66 ±0.07 ±0.09	99	BATTLE	94 CLEO	E_{cm}^{ee} ≈ 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.72 ±0.04 ±0.04	728	BUSKULIC	96 ALEP	Repl. by BARATE 99K
0.59 ±0.18	16	MILLS	84 DLCO	E_{cm}^{ee} =29 GeV
1.3 ±0.5	15	BLOCKER	82B MRK2	E_{cm}^{ee} =3.9–6.7 GeV

NODE=S035B97
NODE=S035B97

NOTFITTED
NOTFITTED

NODE=S035B97;LINKAGE=AU

NODE=S035B97;LINKAGE=N1

NODE=S035R6
NODE=S035R6

NOTFITTED

NODE=S035R6;LINKAGE=SC

NODE=S035R6;LINKAGE=D

NODE=S035C78
NODE=S035C78

NODE=S035C78;LINKAGE=AU

NODE=S035R7
NODE=S035R7

¹The correlation coefficient between this measurement and the ABBIENDI 01J $B(\tau^- \rightarrow K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau)$ is 0.60.

NODE=S035R7;LINKAGE=AJ

$\Gamma(K^- \nu_\tau)/\Gamma(e^- \bar{\nu}_e \nu_\tau)$	Γ_{10}/Γ_5			
VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
3.93 ± 0.06 OUR FIT	Error includes scale factor of 1.1.			
3.882 ± 0.032 ± 0.057	25k	¹ AUBERT	10F BABR	$467 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹See footnote to AUBERT 10F $\Gamma(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ for correlations with other measurements.

NODE=S035C79
NODE=S035C79

$\Gamma(K^- \nu_\tau)/\Gamma(\pi^- \nu_\tau)$	Γ_{10}/Γ_9			
VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT	
6.46 ± 0.10 OUR FIT	Error includes scale factor of 1.1.			
• • • We use the following data for averages but not for fits. • • •				
6.531 ± 0.056 ± 0.093	¹ AUBERT	10F BABR	$467 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

¹Not independent of AUBERT 10F $\Gamma(\tau^- \rightarrow \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ and $\Gamma(\tau^- \rightarrow K^- \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$.

NODE=S035C79;LINKAGE=AU

$\Gamma(h^- \geq 1 \text{ neutrals} \nu_\tau)/\Gamma_{\text{total}}$	Γ_{11}/Γ			
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
37.10 ± 0.10 OUR FIT	Error includes scale factor of 1.2.			

VALUE (%)	DOCUMENT ID	TECN	COMMENT	
37.10 ± 0.10 OUR FIT	Error includes scale factor of 1.2.			
• • • We do not use the following data for averages, fits, limits, etc. • • •				
36.14 ± 0.33 ± 0.58	¹ AKERS	94E OPAL	1991–1992 LEP runs	

38.4 ± 1.2 ± 1.0	2 BURCHAT	87 MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
42.7 ± 2.0 ± 2.9	BERGER	85 PLUT	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$

1 Not independent of ACKERSTAFF 98M $B(h^- \pi^0 \nu_\tau)$ and $B(h^- \geq 2\pi^0 \nu_\tau)$ values.

NODE=S035C80
NODE=S035C80

2 BURCHAT 87 quote for $B(\pi^\pm \geq 1 \text{ neutral} \nu_\tau) = 0.378 \pm 0.012 \pm 0.010$. We add 0.006 to account for contribution from ($K^{*-} \nu_\tau$) which they fixed at BR = 0.013.

NOTFITTED

NODE=S035C80;LINKAGE=AU

$\Gamma(h^- \geq 1\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$	Γ_{11}/Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
36.58 ± 0.10 OUR FIT	Error includes scale factor of 1.2. [(36.57 ± 0.10)% OUR 2012 FIT Scale factor = 1.2]			

• • • We use the following data for averages but not for fits. • • •				
36.641 ± 0.155 ± 0.127	45k	¹ ABDALLAH	06A DLPH	1992–1995 LEP runs

1 See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

NODE=S035R42;LINKAGE=AE
NODE=S035R42;LINKAGE=B

$\Gamma(h^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$	$\Gamma_{13}/\Gamma = (\Gamma_{14} + \Gamma_{16})/\Gamma$			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
25.95 ± 0.09 OUR FIT	Error includes scale factor of 1.1.			

25.73 ± 0.16 OUR AVERAGE				
25.67 ± 0.01 ± 0.39	5.4M	FUJIKAWA	08 BELL	$72 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
25.740 ± 0.201 ± 0.138	35k	¹ ABDALLAH	06A DLPH	1992–1995 LEP runs
25.89 ± 0.17 ± 0.29		ACKERSTAFF	98M OPAL	1991–1995 LEP runs
25.05 ± 0.35 ± 0.50	6613	ACCIARRI	95 L3	1992 LEP run
25.87 ± 0.12 ± 0.42	51k	² ARTUSO	94 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •				
25.76 ± 0.15 ± 0.13	31k	BUSKULIC	96 ALEP	Repl. by SCHABEL 05C
25.98 ± 0.36 ± 0.52		³ AKERS	94E OPAL	Repl. by ACKER-STAFF 98M
22.9 ± 0.8 ± 1.3	283	⁴ ABREU	92N DLPH	$E_{\text{cm}}^{\text{ee}} = 88.2\text{--}94.2 \text{ GeV}$
23.1 ± 0.4 ± 0.9	1249	⁵ ALBRECHT	92Q ARG	$E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
25.02 ± 0.64 ± 0.88	1849	DECAMP	92C ALEP	1989–1990 LEP runs
22.0 ± 0.8 ± 1.9	779	ANTREASYAN	91 CBAL	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$
22.6 ± 1.5 ± 0.7	1101	BEHREND	90 CELL	$E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$
23.1 ± 1.9 ± 1.6		BEHREND	84 CELL	$E_{\text{cm}}^{\text{ee}} = 14.22 \text{ GeV}$

NODE=S035C01
NODE=S035C01

NEW

NOTFITTED

NODE=S035C01;LINKAGE=AH

NODE=S035R84
NODE=S035R84

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² ARTUSO 94 reports the combined result from three independent methods, one of which (23% of the $\tau^- \rightarrow h^- \pi^0 \nu_\tau$) is normalized to the inclusive one-prong branching fraction, taken as 0.854 ± 0.004 . Renormalization to the present value causes negligible change.

³ AKERS 94E quote $(26.25 \pm 0.36 \pm 0.52) \times 10^{-2}$; we subtract 0.27% from their number to correct for $\tau^- \rightarrow h^- K_L^0 \nu_\tau$.

⁴ ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

⁵ ALBRECHT 92Q with 0.5% added to remove their correction for $\tau^- \rightarrow K^*(892)^- \nu_\tau$ background.

$\Gamma(\pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
25.52 ± 0.09 OUR FIT				Error includes scale factor of 1.1.

25.46 ± 0.12 OUR AVERAGE

$25.471 \pm 0.097 \pm 0.085$ 81k ¹ SCHAEL 05C ALEP 1991-1995 LEP runs

• • • We use the following data for averages but not for fits. • • •

25.36 ± 0.44 ² ARTUSO 94 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$25.30 \pm 0.15 \pm 0.13$ ³ BUSKULIC 96 ALEP Repl. by SCHAEL 05C

$21.5 \pm 0.4 \pm 1.9$ 4400 ^{4,5} ALBRECHT 88L ARG $E_{\text{cm}}^{\text{ee}} = 10$ GeV

$23.0 \pm 1.3 \pm 1.7$ 582 ADLER 87B MRK3 $E_{\text{cm}}^{\text{ee}} = 3.77$ GeV

$25.8 \pm 1.7 \pm 2.5$ ⁶ BURCHAT 87 MRK2 $E_{\text{cm}}^{\text{ee}} = 29$ GeV

$22.3 \pm 0.6 \pm 1.4$ 629 ⁵ YELTON 86 MRK2 $E_{\text{cm}}^{\text{ee}} = 29$ GeV

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² Not independent of ARTUSO 94 B($h^- \pi^0 \nu_\tau$) and BATTLE 94 B($K^- \pi^0 \nu_\tau$) values.

³ Not independent of BUSKULIC 96 B($h^- \pi^0 \nu_\tau$) and B($K^- \pi^0 \nu_\tau$) values.

⁴ The authors divide by $(\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10})/\Gamma = 0.467$ to obtain this result.

⁵ Experiment had no hadron identification. Kaon corrections were made, but insufficient information is given to permit their removal.

⁶ BURCHAT 87 value is not independent of YELTON 86 value. Nonresonant decays included.

$\Gamma(\pi^- \pi^0 \text{non-}\rho(770)\nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$0.3 \pm 0.1 \pm 0.3$	¹ BEHREND 84 CELL	$E_{\text{cm}}^{\text{ee}} = 14,22$ GeV	

¹ BEHREND 84 assume a flat nonresonant mass distribution down to the $\rho(770)$ mass, using events with mass above 1300 to set the level.

$\Gamma(K^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.429 ± 0.015 OUR FIT				

0.426 ± 0.016 OUR AVERAGE

$0.416 \pm 0.003 \pm 0.018$ 78k AUBERT 07AP BABR 230 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6$ GeV

$0.471 \pm 0.059 \pm 0.023$ 360 ABBIENDI 04J OPAL 1991-1995 LEP runs

$0.444 \pm 0.026 \pm 0.024$ 923 BARATE 99K ALEP 1991-1995 LEP runs

$0.51 \pm 0.10 \pm 0.07$ 37 BATTLE 94 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.52 \pm 0.04 \pm 0.05$ 395 BUSKULIC 96 ALEP Repl. by BARATE 99K

$\Gamma(h^- \geq 2\pi^0 \nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{17}/\Gamma = (\Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.157\Gamma_{35} + 0.157\Gamma_{37} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.0985\Gamma_{47} + 0.319\Gamma_{140} + 0.322\Gamma_{142})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
10.87 ± 0.11 OUR FIT				Error includes scale factor of 1.2.

$9.91 \pm 0.31 \pm 0.27$ ACKERSTAFF 98M OPAL 1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

$9.89 \pm 0.34 \pm 0.55$ ¹ AKERS 94E OPAL Repl. by ACKER-STAFF 98M

$14.0 \pm 1.2 \pm 0.6$ 938 ² BEHREND 90 CELL $E_{\text{cm}}^{\text{ee}} = 35$ GeV

$12.0 \pm 1.4 \pm 2.5$ ³ BURCHAT 87 MRK2 $E_{\text{cm}}^{\text{ee}} = 29$ GeV

$13.9 \pm 2.0 \begin{array}{l} +1.9 \\ -2.2 \end{array}$ ⁴ AIHARA 86E TPC $E_{\text{cm}}^{\text{ee}} = 29$ GeV

¹ AKERS 94E not independent of AKERS 94E B($h^- \geq 1\pi^0 \nu_\tau$) and B($h^- \pi^0 \nu_\tau$) measurements.

² No independent of BEHREND 90 $\Gamma(h^- 2\pi^0 \nu_\tau \text{ (exp. } K^0\text{)})$ and $\Gamma(h^- \geq 3\pi^0 \nu_\tau)$.

³ Error correlated with BURCHAT 87 $\Gamma(\rho^- \nu_e)/\Gamma_{\text{total}}$ value.

⁴ AIHARA 86E (TPC) quote $B(2\pi^0 \pi^- \nu_\tau) + 1.6B(3\pi^0 \pi^- \nu_\tau) + 1.1B(\pi^0 \eta \pi^- \nu_\tau)$.

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NOTFITTED

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NODE=S035R44;LINKAGE=A

$$\Gamma(h^- 2\pi^0 \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_{18} / \Gamma = (\Gamma_{20} + \Gamma_{23} + 0.157 \Gamma_{35} + 0.157 \Gamma_{37}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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9.52 ± 0.11 OUR FIT Error includes scale factor of 1.1.

• • • We do not use the following data for averages, fits, limits, etc. • • •

9.48 ± 0.13 ± 0.10	12k	¹ BUSKULIC	96	ALEP Repl. by SCHAEEL 05C 1 BUSKULIC 96 quote $9.29 \pm 0.13 \pm 0.10$. We add 0.19 to undo their correction for $\tau^- \rightarrow h^- K^0 \nu_\tau$.
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$$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$$

$$\Gamma_{19} / \Gamma = (\Gamma_{20} + \Gamma_{23}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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9.36 ± 0.11 OUR FIT Error includes scale factor of 1.2.

9.17 ± 0.27 OUR AVERAGE

9.498 ± 0.320 ± 0.275	9.5k	¹ ABDALLAH	06A	DLPH 1992–1995 LEP runs
8.88 ± 0.37 ± 0.42	1060	ACCIARRI	95	L3 1992 LEP run

• • • We use the following data for averages but not for fits. • • •

8.96 ± 0.16 ± 0.44		² PROCARIO	93	CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

10.38 ± 0.66 ± 0.82	809	³ DECAMP	92C	ALEP Repl. by SCHAEEL 05C
5.7 ± 0.5 ± 1.7	133	⁴ ANTREASYAN	91	CBAL $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$
10.0 ± 1.5 ± 1.1	333	⁵ BEHREND	90	CELL $E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$
8.7 ± 0.4 ± 1.1	815	⁶ BAND	87	MAC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
6.2 ± 0.6 ± 1.2		⁷ GAN	87	MRK2 $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
6.0 ± 3.0 ± 1.8		BEHREND	84	CELL $E_{\text{cm}}^{\text{ee}} = 14.22 \text{ GeV}$

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

² PROCARIO 93 entry is obtained from $B(h^- 2\pi^0 \nu_\tau) / B(h^- \pi^0 \nu_\tau)$ using ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$.

³ We subtract 0.0015 to account for $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁴ ANTREASYAN 91 subtract 0.001 to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁵ BEHREND 90 subtract 0.002 to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁶ BAND 87 assume $B(\pi^- 3\pi^0 \nu_\tau) = 0.01$ and $B(\pi^- \pi^0 \eta \nu_\tau) = 0.005$.

⁷ GAN 87 analysis use photon multiplicity distribution.

$$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma(h^- \pi^0 \nu_\tau)$$

$$\Gamma_{19} / \Gamma_{13} = (\Gamma_{20} + \Gamma_{23}) / (\Gamma_{14} + \Gamma_{16})$$

VALUE	DOCUMENT ID	TECN	COMMENT
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0.361 ± 0.005 OUR FIT Error includes scale factor of 1.1.

0.342 ± 0.006 ± 0.016	¹ PROCARIO	93	CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
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¹ PROCARIO 93 quote $0.345 \pm 0.006 \pm 0.016$ after correction for 2 kaon backgrounds assuming $B(K^{*-} \nu_\tau) = 1.42 \pm 0.18\%$ and $B(h^- K^0 \pi^0 \nu_\tau) = 0.48 \pm 0.48\%$. We multiply by 0.990 ± 0.010 to remove these corrections to $B(h^- \pi^0 \nu_\tau)$.

$$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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9.30 ± 0.11 OUR FIT Error includes scale factor of 1.2.

9.239 ± 0.086 ± 0.090	31k	¹ SCHAEEL	05C	ALEP 1991–1995 LEP runs
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• • • We do not use the following data for averages, fits, limits, etc. • • •

9.21 ± 0.13 ± 0.11		² BUSKULIC	96	ALEP Repl. by SCHAEEL 05C
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¹ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

² Not independent of BUSKULIC 96 $B(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ and $B(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ values.

$$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0), \text{scalar}) / \Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.094	95	¹ BROWDER	00	CLEO $4.7 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
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¹ Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from scalars.

Γ₁₈/Γ

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NODE=S035B74;LINKAGE=E

Γ₁₉/Γ

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NODE=S035R20;LINKAGE=G

NODE=S035R20;LINKAGE=C

Γ₁₉/Γ₁₃

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NOTFITTED

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NODE=S035C48

NODE=S035C48

NODE=S035C48;LINKAGE=A

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0), \text{vector})/\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$					Γ_{22}/Γ_{20}
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.073	95	1 BROWDER	00	CLEO 4.7 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
1 Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from vectors.					

$\Gamma(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$					Γ_{23}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
6.5 ± 2.3 OUR FIT					
5.8 ± 2.4 OUR AVERAGE					
5.6 ± 2.0 ± 1.5 131 BARATE 99K ALEP 1991–1995 LEP runs 9 ± 10 ± 3 3 1 BATTLE 94 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8 ± 2 ± 2	59	BUSKULIC	96	ALEP Repl. by BARATE 99K 1 BATTLE 94 quote $(14 \pm 10 \pm 3) \times 10^{-4}$ or $< 30 \times 10^{-4}$ at 90% CL. We subtract $(5 \pm 2) \times 10^{-4}$ to account for $\tau^- \rightarrow K^- (K^0 \rightarrow \pi^0 \pi^0) \nu_\tau$ background.	

$\Gamma(h^- \geq 3\pi^0 \nu_\tau)/\Gamma_{\text{total}}$					Γ_{24}/Γ
$\Gamma_{24}/\Gamma = (\Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.0985\Gamma_{47} + 0.319\Gamma_{140} + 0.322\Gamma_{142})/\Gamma$					

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
1.35 ± 0.07 OUR FIT				Error includes scale factor of 1.1.	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.53 ± 0.40 ± 0.46	186	DECAMP	92C	ALEP Repl. by SCHAEFEL 05C	
3.2 ± 1.0 ± 1.0		BEHREND	90	CELL $E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$	

$\Gamma(h^- \geq 3\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$					Γ_{25}/Γ
$\Gamma_{25}/\Gamma = (\Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.325\Gamma_{140} + 0.325\Gamma_{142})/\Gamma$					
1.26 ± 0.07 OUR FIT				Error includes scale factor of 1.1.	
1.403 ± 0.214 ± 0.224	1.1k	1 ABDALLAH	06A	DALPH 1992–1995 LEP runs	

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(h^- 3\pi^0 \nu_\tau)/\Gamma_{\text{total}}$					Γ_{26}/Γ
$\Gamma_{26}/\Gamma = (\Gamma_{27} + \Gamma_{28} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.322\Gamma_{142})/\Gamma$					
1.19 ± 0.07 OUR FIT				Error includes scale factor of 1.2.	

$\Gamma(h^- 3\pi^0 \nu_\tau)$					Γ_{26}/Γ_{13}
$\Gamma_{26}/\Gamma_{13} = (\Gamma_{27} + \Gamma_{28} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.322\Gamma_{142})/(\Gamma_{14} + \Gamma_{16})$					
0.0459 ± 0.0029 OUR FIT					
0.044 ± 0.003 ± 0.005	1 PROCARIO	93	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$	

¹ PROCARIO 93 quote $0.041 \pm 0.003 \pm 0.005$ after correction for 2 kaon backgrounds assuming $B(K^{*-} \nu_\tau) = 1.42 \pm 0.18\%$ and $B(h^- K^0 \pi^0 \nu_\tau) = 0.48 \pm 0.48\%$. We add 0.003 ± 0.003 and multiply the sum by 0.990 ± 0.010 to remove these corrections.

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$\Gamma(\pi^- 3\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{27}/Γ
1.05 ± 0.07 OUR FIT					NODE=S035B56 NODE=S035B56
0.977 ± 0.069 ± 0.058	6.1k	¹ SCHAEL	05C ALEP	1991-1995 LEP runs	

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

 $\Gamma(K^- 3\pi^0 \nu_\tau (\text{ex. } K^0, \eta)) / \Gamma_{\text{total}}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{28}/Γ
4.8 ± 2.2 OUR FIT					NODE=S035B31 NODE=S035B31

3.7 ± 2.1 ± 1.1 22 BARATE 99K ALEP 1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

5 ± 13 ¹ BUSKULIC 94E ALEP Repl. by BARATE 99K

¹ BUSKULIC 94E quote $B(K^- \geq 0\pi^0 \geq 0K^0 \nu_\tau) = [B(K^- \nu_\tau) + B(K^- \pi^0 \nu_\tau) + B(K^- K^0 \nu_\tau) + B(K^- \pi^0 \pi^0 \nu_\tau) + B(K^- \pi^0 K^0 \nu_\tau)] = (5 \pm 13) \times 10^{-4}$ accounting for common systematic errors in BUSKULIC 94E and BUSKULIC 94F measurements of these modes. We assume $B(K^- \geq 2K^0 \nu_\tau)$ and $B(K^- \geq 4\pi^0 \nu_\tau)$ are negligible.

 $\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$

$$\Gamma_{29}/\Gamma = (\Gamma_{30} + 0.319\Gamma_{140})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{29}/Γ
0.16 ± 0.04 OUR FIT					NODE=S035B79

0.16 ± 0.05 ± 0.05 ¹ PROCARIO 93 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.16 ± 0.04 ± 0.09 232 ² BUSKULIC 96 ALEP Repl. by SCHAEL 05C

¹ PROCARIO 93 quotes $B(h^- 4\pi^0 \nu_\tau) / B(h^- \pi^0 \nu_\tau) = 0.006 \pm 0.002 \pm 0.002$. We multiply by the ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$ to obtain $B(h^- 4\pi^0 \nu_\tau)$. PROCARIO 93 assume $B(h^- \geq 5 \pi^0 \nu_\tau)$ is small and do not correct for it.

² BUSKULIC 96 quote result for $\tau^- \rightarrow h^- \geq 4\pi^0 \nu_\tau$. We assume $B(h^- \geq 5\pi^0 \nu_\tau)$ is negligible.

 $\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex. } K^0, \eta)) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{30}/Γ
0.11 ± 0.04 OUR FIT					NODE=S035B23 NODE=S035B23

0.112 ± 0.037 ± 0.035 ¹ SCHAEL 05C ALEP 1991-1995 LEP runs

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

 $\Gamma(K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{31}/Γ
1.572 ± 0.033 OUR FIT		Error includes scale factor of 1.1.			NODE=S035B23;LINKAGE=SC

1.53 ± 0.04 OUR AVERAGE

1.528 ± 0.039 ± 0.040 ¹ ABBIENDI 01J OPAL 1990-1995 LEP runs

1.54 ± 0.24 ABREU 94K DLPH LEP 1992 Z data

1.70 ± 0.12 ± 0.19 202 ² BATTLE 94 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

1.520 ± 0.040 ± 0.041 4006 ³ BARATE 99K ALEP 1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.70 ± 0.05 ± 0.06 1610 ⁴ BUSKULIC 96 ALEP Repl. by BARATE 99K

1.6 ± 0.4 ± 0.2 35 AIHARA 87B TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

1.71 ± 0.29 53 MILLS 84 DLCO $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

¹ The correlation coefficient between this measurement and the ABBIENDI 01J $B(\tau^- \rightarrow K^- \nu_\tau)$ is 0.60.

² BATTLE 94 quote $1.60 \pm 0.12 \pm 0.19$. We add 0.10 ± 0.02 to correct for their rejection of $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

³ Not independent of BARATE 99K $B(K^- \nu_\tau)$, $B(K^- \pi^0 \nu_\tau)$, $B(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$, $B(K^- 3\pi^0 \nu_\tau (\text{ex. } K^0))$, $B(K^- K^0 \nu_\tau)$, and $B(K^- K^0 \pi^0 \nu_\tau)$ values.

⁴ Not independent of BUSKULIC 96 $B(K^- \nu_\tau)$, $B(K^- \pi^0 \nu_\tau)$, $B(K^- 2\pi^0 \nu_\tau)$, $B(K^- K^0 \nu_\tau)$, and $B(K^- K^0 \pi^0 \nu_\tau)$ values.

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NOTFITTED

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NODE=S035R26;LINKAGE=9K

NODE=S035R26;LINKAGE=AA

$\Gamma(K^- \geq 1(\pi^0 \text{ or } K^0 \text{ or } \gamma) \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.872 ± 0.032 OUR FIT		Error includes scale factor of 1.1.		

0.86 ± 0.05 OUR AVERAGE

• • • We use the following data for averages but not for fits. • • •

0.869 ± 0.031 ± 0.034	¹ ABBIENDI	01J OPAL	1990–1995 LEP runs	NOTFITTED
0.69 ± 0.25	² ABREU	94K DLPH	LEP 1992 Z data	NOTFITTED

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.2 ± 0.5 ± 0.2	9	AIHARA	87B TPC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
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¹ Not independent of ABBIENDI 01J $B(\tau^- \rightarrow K^- \nu_\tau)$ and $B(\tau^- \rightarrow K^- \geq 0 \pi^0 \geq 0 K^0 \geq 0 \gamma \nu_\tau)$ values.

² Not independent of ABREU 94K $B(K^- \nu_\tau)$ and $B(K^- \geq 0 \text{ neutrals} \nu_\tau)$ measurements.

 $\Gamma(K_S^0(\text{particles})^- \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.92 ± 0.04 OUR FIT		Error includes scale factor of 1.5. [(0.92 ± 0.04)% OUR 2012 FIT Scale factor = 1.5]		

0.97 ± 0.07 OUR AVERAGE

0.970 ± 0.058 ± 0.062	929	BARATE	98E ALEP	1991–1995 LEP runs
0.97 ± 0.09 ± 0.06	141	AKERS	94G OPAL	$E_{\text{cm}}^{\text{ee}} = 88–94 \text{ GeV}$

 $\Gamma(h^- \bar{K}^0 \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.00 ± 0.05 OUR FIT		Error includes scale factor of 1.8.		

0.90 ± 0.07 OUR AVERAGE

0.855 ± 0.036 ± 0.073	1242	COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
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• • • We use the following data for averages but not for fits. • • •

1.01 ± 0.11 ± 0.07	555	¹ BARATE	98E ALEP	1991–1995 LEP runs
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¹ Not independent of BARATE 98E $B(\tau^- \rightarrow \pi^- \bar{K}^0 \nu_\tau)$ and $B(\tau^- \rightarrow K^- K^0 \nu_\tau)$ values.

 $\Gamma(\pi^- \bar{K}^0 \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.84 ± 0.04 OUR FIT		Error includes scale factor of 2.1.		

0.831 ± 0.030 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.

0.808 ± 0.004 ± 0.026	53k	EPIFANOV	07 BELL	$351 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
0.933 ± 0.068 ± 0.049	377	ABBIENDI	00C OPAL	1991–1995 LEP runs
0.928 ± 0.045 ± 0.034	937	¹ BARATE	99K ALEP	1991–1995 LEP runs
0.95 ± 0.15 ± 0.06		² ACCIARRI	95F L3	1991–1993 LEP runs

• • • We use the following data for averages but not for fits. • • •

0.855 ± 0.117 ± 0.066	509	³ BARATE	98E ALEP	1991–1995 LEP runs
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0.704 ± 0.041 ± 0.072		⁴ COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.79 ± 0.10 ± 0.09	98	⁵ BUSKULIC	96 ALEP	Repl. by BARATE 99K
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¹ BARATE 99K measure K^0_L 's by detecting K^0_L 's in their hadron calorimeter.

² ACCIARRI 95F do not identify π^- / K^- and assume $B(K^- K^0 \nu_\tau) = (0.29 \pm 0.12)\%$.

³ BARATE 98E reconstruct K^0_L 's using $K^0_S \rightarrow \pi^+ \pi^-$ decays. Not independent of BARATE 98E $B(K^0 \text{ particles}^- \nu_\tau)$ value.

⁴ Not independent of COAN 96 $B(h^- K^0 \nu_\tau)$ and $B(K^- K^0 \nu_\tau)$ measurements.

⁵ BUSKULIC 96 measure K^0_L 's by detecting K^0_L 's in their hadron calorimeter.

 Γ_{32}/Γ

NODE=S035R27

NODE=S035R27

NODE=S035R27

0.872 ± 0.032 OUR FIT Error includes scale factor of 1.1.

0.86 ± 0.05 OUR AVERAGE

• • • We use the following data for averages but not for fits. • • •

0.869 ± 0.031 ± 0.034	¹ ABBIENDI	01J OPAL	1990–1995 LEP runs	NOTFITTED
0.69 ± 0.25	² ABREU	94K DLPH	LEP 1992 Z data	NOTFITTED

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.2 ± 0.5 ± 0.2	9	AIHARA	87B TPC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
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¹ Not independent of ABBIENDI 01J $B(\tau^- \rightarrow K^- \nu_\tau)$ and $B(\tau^- \rightarrow K^- \geq 0 \pi^0 \geq 0 K^0 \geq 0 \gamma \nu_\tau)$ values.

² Not independent of ABREU 94K $B(K^- \nu_\tau)$ and $B(K^- \geq 0 \text{ neutrals} \nu_\tau)$ measurements.

NODE=S035R27;LINKAGE=AB

NODE=S035R27;LINKAGE=A

NODE=S035B43

NODE=S035B43

NODE=S035B43

NEW

 $\Gamma_{34}/\Gamma = (\Gamma_{35} + \Gamma_{37})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.00 ± 0.05 OUR FIT		Error includes scale factor of 1.8.		

0.90 ± 0.07 OUR AVERAGE

0.855 ± 0.036 ± 0.073	1242	COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
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• • • We use the following data for averages but not for fits. • • •

1.01 ± 0.11 ± 0.07	555	¹ BARATE	98E ALEP	1991–1995 LEP runs
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¹ Not independent of BARATE 98E $B(\tau^- \rightarrow \pi^- \bar{K}^0 \nu_\tau)$ and $B(\tau^- \rightarrow K^- K^0 \nu_\tau)$ values.

NODE=S035B67

NODE=S035B67

NODE=S035B32

NODE=S035B32

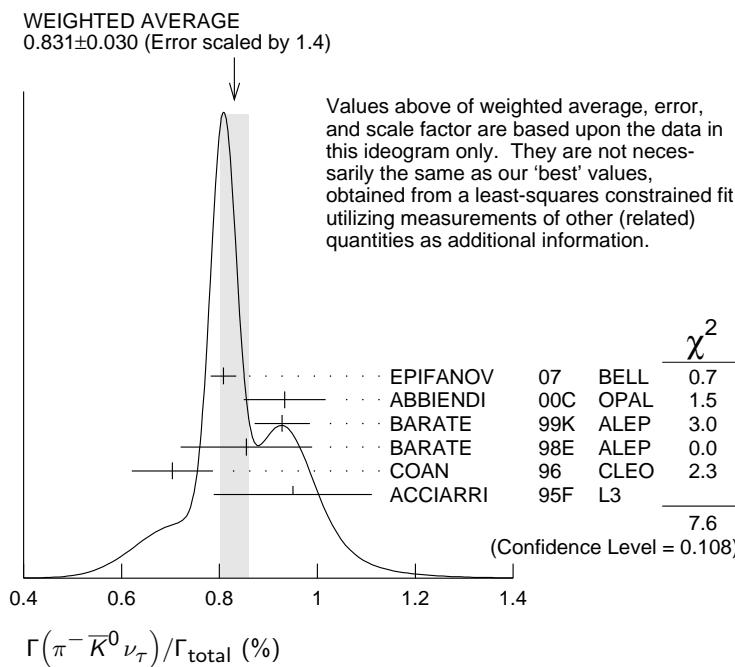
NODE=S035B32;LINKAGE=9K

NODE=S035B32;LINKAGE=A

NODE=S035B32;LINKAGE=B9

NODE=S035B32;LINKAGE=B

NODE=S035B32;LINKAGE=B6



$\Gamma(\pi^- \bar{K}^0 (\text{non-}K^*(892)^-) \nu_\tau) / \Gamma_{\text{total}}$

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
5.4±2.1		1 EPIFANOV	07	BELL $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<17 95 ACCIARRI 95F L3 1991–1993 LEP runs

1 EPIFANOV 07 quote $B(\tau^- \rightarrow K^*(892)^- \nu_\tau) B(K^*(892)^- \rightarrow K_S^0 \pi^-) / B(\tau^- \rightarrow K_S^0 \pi^- \nu_\tau) = 0.933 \pm 0.027$. We multiply their $B(\tau^- \rightarrow \bar{K}^0 \pi^- \nu_\tau)$ by $[1 - (0.933 \pm 0.027)]$ to obtain this result.

$\Gamma(K^- K^0 \nu_\tau) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.159±0.016 OUR FIT

0.158±0.017 OUR AVERAGE

0.162±0.021±0.011 150 1 BARATE 99K ALEP 1991–1995 LEP runs
0.158±0.042±0.017 46 2 BARATE 98E ALEP 1991–1995 LEP runs

0.151±0.021±0.022 111 COAN 96 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.26 ± 0.09 ± 0.02 13 3 BUSKULIC 96 ALEP Repl. by BARATE 99K

1 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

2 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

3 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

$\Gamma(K^- K^0 \geq 0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.318±0.023 OUR FIT

0.330±0.055±0.039 124 ABBIENDI 00C OPAL 1991–1995 LEP runs

$\Gamma(h^- \bar{K}^0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.56 ± 0.04 OUR FIT

[(0.55 ± 0.04)% OUR 2012 FIT]

0.50 ± 0.06 OUR AVERAGE Error includes scale factor of 1.2.

0.562±0.050±0.048 264 COAN 96 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

0.446±0.052±0.046 157 1 BARATE 98E ALEP 1991–1995 LEP runs

1 Not independent of BARATE 98E $B(\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau)$ and $B(\tau^- \rightarrow K^- K^0 \pi^0 \nu_\tau)$ values.

Γ_{36}/Γ

NODE=S035B52
NODE=S035B52

Γ_{37}/Γ

NODE=S035R46
NODE=S035R46

$\Gamma_{38}/\Gamma = (\Gamma_{37} + \Gamma_{42})/\Gamma$

NODE=S035R46;LINKAGE=9K
NODE=S035R46;LINKAGE=B9
NODE=S035R46;LINKAGE=B6

NODE=S035C38
NODE=S035C38

$\Gamma_{39}/\Gamma = (\Gamma_{40} + \Gamma_{42})/\Gamma$

NODE=S035B68
NODE=S035B68
NEW

NOTFITTED

NODE=S035B68;LINKAGE=B9

$\Gamma(\pi^-\bar{K}^0\pi^0\nu_\tau)/\Gamma_{\text{total}}$		Γ_{40}/Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.40 ±0.04 OUR FIT					NODE=S035B33 NODE=S035B33
0.36 ±0.04 OUR AVERAGE					
0.347±0.053±0.037	299	1 BARATE	99K ALEP	1991–1995 LEP runs	
0.294±0.073±0.037	142	2 BARATE	98E ALEP	1991–1995 LEP runs	
0.41 ±0.12 ±0.03		3 ACCIARRI	95F L3	1991–1993 LEP runs	
• • • We use the following data for averages but not for fits. • • •					
0.417±0.058±0.044		4 COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$	NOTFITTED
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.32 ±0.11 ±0.05	23	5 BUSKULIC	96 ALEP	Repl. by BARATE 99K	
1 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.					
2 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+\pi^-$ decays.					
3 ACCIARRI 95F do not identify π^-/K^- and assume $B(K^-\bar{K}^0\pi^0\nu_\tau) = (0.05 \pm 0.05)\%$.					
4 Not independent of COAN 96 $B(h^-\bar{K}^0\pi^0\nu_\tau)$ and $B(K^-\bar{K}^0\pi^0\nu_\tau)$ measurements.					
5 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.					

$\Gamma(\bar{K}^0\rho^-\nu_\tau)/\Gamma_{\text{total}}$		Γ_{41}/Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.22 ±0.05 OUR AVERAGE					NODE=S035C10 NODE=S035C10
0.250±0.057±0.044		1 BARATE	99K ALEP	1991–1995 LEP runs	
0.188±0.054±0.038		2 BARATE	98E ALEP	1991–1995 LEP runs	
1 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter. They determine the $\bar{K}^0\rho^-$ fraction in $\tau^- \rightarrow \pi^-\bar{K}^0\pi^0\nu_\tau$ decays to be $(0.72 \pm 0.12 \pm 0.10)$ and multiply their $B(\pi^-\bar{K}^0\pi^0\nu_\tau)$ measurement by this fraction to obtain the quoted result.					
2 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+\pi^-$ decays. They determine the $\bar{K}^0\rho^-$ fraction in $\tau^- \rightarrow \pi^-\bar{K}^0\pi^0\nu_\tau$ decays to be $(0.64 \pm 0.09 \pm 0.10)$ and multiply their $B(\pi^-\bar{K}^0\pi^0\nu_\tau)$ measurement by this fraction to obtain the quoted result.					

$\Gamma(K^-\bar{K}^0\pi^0\nu_\tau)/\Gamma_{\text{total}}$		Γ_{42}/Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.159±0.020 OUR FIT					NODE=S035B34 NODE=S035B34
0.144±0.023 OUR AVERAGE					
0.143±0.025±0.015	78	1 BARATE	99K ALEP	1991–1995 LEP runs	
0.152±0.076±0.021	15	2 BARATE	98E ALEP	1991–1995 LEP runs	
0.145±0.036±0.020	32	COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.10 ±0.05 ±0.03	5	3 BUSKULIC	96 ALEP	Repl. by BARATE 99K	
1 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.					
2 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+\pi^-$ decays.					
3 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.					

$\Gamma(\pi^-\bar{K}^0 \geq 1\pi^0\nu_\tau)/\Gamma_{\text{total}}$		$\Gamma_{43}/\Gamma = (\Gamma_{40} + \Gamma_{44})/\Gamma$			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.324±0.074±0.066	148	ABBIENDI	00C OPAL	1991–1995 LEP runs	NODE=S035C37 NODE=S035C37
$\Gamma(\pi^-\bar{K}^0\pi^0\nu_\tau)/\Gamma_{\text{total}}$		Γ_{44}/Γ			
VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.26±0.24			1 BARATE	99R ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.66	95	17	2 BARATE	99K ALEP	1991–1995 LEP runs
0.58±0.33±0.14	5	3 BARATE	98E ALEP	1991–1995 LEP runs	
1 BARATE 99R combine the BARATE 98E and BARATE 99K measurements to obtain this value.					
2 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.					
3 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+\pi^-$ decays.					

$\Gamma(K^- K^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{45}/Γ
$<0.16 \times 10^{-3}$	95	1 BARATE	99R ALEP	1991–1995 LEP runs	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<0.18 \times 10^{-3}$	95	2 BARATE	99K ALEP	1991–1995 LEP runs	
$<0.39 \times 10^{-3}$	95	3 BARATE	98E ALEP	1991–1995 LEP runs	

1 BARATE 99R combine the BARATE 98E and BARATE 99K bounds to obtain this value.
 2 BARATE 99K measure K^0 's by detecting K_L^0 's in hadron calorimeter.
 3 BARATE 98E reconstruct K^0 's by using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

NODE=S035B99
 NODE=S035B99

 $\Gamma(\pi^- K^0 \bar{K}^0 \nu_\tau)/\Gamma_{\text{total}}$ $\Gamma_{46}/\Gamma = (2\Gamma_{47} + \Gamma_{48})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_{46}/\Gamma = (2\Gamma_{47} + \Gamma_{48})/\Gamma$
0.17 ± 0.04 OUR FIT		Error includes scale factor of 1.8. [(0.17 ± 0.04)% OUR 2012 FIT Scale factor = 1.7]			

$\bullet \bullet \bullet$ We use the following data for averages but not for fits. $\bullet \bullet \bullet$

0.153±0.030±0.016	74	1 BARATE	98E ALEP	1991–1995 LEP runs	
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$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$

0.31 ± 0.12 ± 0.04		2 ACCIARRI	95F L3	1991–1993 LEP runs	
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1 BARATE 98E obtain this value by adding twice their $B(\pi^- K_S^0 K_S^0 \nu_\tau)$ value to their $B(\pi^- K_S^0 K_L^0 \nu_\tau)$ value.

2 ACCIARRI 95F assume $B(\pi^- K_S^0 K_S^0 \nu) = B(\pi^- K_S^0 K_L^0 \nu) = 1/2 B(\pi^- K_S^0 K_L^0 \nu)$.

 $\Gamma(\pi^- K_S^0 K_S^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{47}/Γ

Bose-Einstein correlations might make the mixing fraction different than 1/4.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{47}/Γ
2.31±0.17 OUR FIT		Error includes scale factor of 1.9. [(2.4 ± 0.5) × 10 ⁻⁴ OUR 2012 FIT]			

2.31±0.09 OUR AVERAGE

[(2.4 ± 0.5) × 10⁻⁴ OUR 2012 AVERAGE]

2.31±0.04±0.08	5.0k	LEES	12Y BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	■
2.6 ± 1.0 ± 0.5	6	BARATE	98E ALEP	1991–1995 LEP runs	
2.3 ± 0.5 ± 0.3	42	COAN	96 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$	

 $\Gamma(\pi^- K_S^0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{48}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{48}/Γ
12 ± 4 OUR FIT		Error includes scale factor of 1.8.			
10.1±2.3±1.3	68	BARATE	98E ALEP	1991–1995 LEP runs	

 $\Gamma(\pi^- K^0 \bar{K}^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{49}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT	Γ_{49}/Γ
(0.31±0.23) × 10⁻³	1 BARATE	99R ALEP	1991–1995 LEP runs	

1 BARATE 99R combine BARATE 98E $\Gamma(\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ measurements to obtain this value.

NODE=S035C1
 NODE=S035C1

 $\Gamma(\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{50}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{50}/Γ
1.60±0.20±0.22	409	LEES	12Y BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$		■

$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$

<2.0	95	BARATE	98E ALEP	1991–1995 LEP runs	
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NODE=S035C2
 NODE=S035C2

 $\Gamma(\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{51}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{51}/Γ
3.1±1.1±0.5	11	BARATE	98E ALEP	1991–1995 LEP runs	

NODE=S035C3
 NODE=S035C3

 $\Gamma(K^- K_S^0 K_S^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{52}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{52}/Γ
<6.3 × 10⁻⁷	90	LEES	12Y BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	■

NODE=S035C99
 NODE=S035C99

 $\Gamma(K^- K_S^0 K_S^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{53}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	Γ_{53}/Γ
<4.0 × 10⁻⁷	90	LEES	12Y BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	■

NODE=S035D01
 NODE=S035D01

$\Gamma(K^0 h^+ h^- h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$					Γ_{54}/Γ
VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT	
<0.17	95	TSCHIRHART	88	HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
<0.27	90	BELTRAMI	85	HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

NODE=S035R37
NODE=S035R37

$\Gamma(K^0 h^+ h^- h^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{55}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
$2.3 \pm 1.9 \pm 0.7$	6	1 BARATE	98E	ALEP	1991–1995 LEP runs
1 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.					

NODE=S035C5
NODE=S035C5

$\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$					Γ_{56}/Γ
$\Gamma_{56}/\Gamma = (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + 0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{64} + \Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{90} + \Gamma_{94} + \Gamma_{98} + \Gamma_{99} + 0.285\Gamma_{140} + 0.285\Gamma_{142} + 0.9101\Gamma_{167} + 0.9101\Gamma_{169})/\Gamma$					

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
15.20 ± 0.08 OUR FIT		Error includes scale factor of 1.3.			
14.8 ± 0.4 OUR AVERAGE					
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
14.4 \pm 0.6 \pm 0.3		ADEVA	91F	L3	$E_{\text{cm}}^{ee} = 88.3\text{--}94.3 \text{ GeV}$
15.0 \pm 0.4 \pm 0.3		BEHREND	89B	CELL	$E_{\text{cm}}^{ee} = 14\text{--}47 \text{ GeV}$
15.1 \pm 0.8 \pm 0.6		AIHARA	87B	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
13.5 \pm 0.3 \pm 0.3		ABACHI	89B	HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
12.8 \pm 1.0 \pm 0.7		¹ BURCHAT	87	MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
12.1 \pm 0.5 \pm 1.2		RUCKSTUHL	86	DLCO	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
12.8 \pm 0.5 \pm 0.8	1420	SCHMIDKE	86	MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
15.3 \pm 1.1 $^{+1.3}_{-1.6}$	367	ALTHOFF	85	TASS	$E_{\text{cm}}^{ee} = 34.5 \text{ GeV}$
13.6 \pm 0.5 \pm 0.8		BARTEL	85F	JADE	$E_{\text{cm}}^{ee} = 34.6 \text{ GeV}$
12.2 \pm 1.3 \pm 3.9		² BERGER	85	PLUT	$E_{\text{cm}}^{ee} = 34.6 \text{ GeV}$
13.3 \pm 0.3 \pm 0.6		FERNANDEZ	85	MAC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
24 \pm 6	35	BRANDELIK	80	TASS	$E_{\text{cm}}^{ee} = 30 \text{ GeV}$
32 \pm 5	692	³ BACINO	78B	DLCO	$E_{\text{cm}}^{ee} = 3.1\text{--}7.4 \text{ GeV}$
35 \pm 11		³ BRANDELIK	78	DASP	Assumes $V\text{--}A$ decay
18 \pm 6.5	33	³ JAROS	78	LGW	$E_{\text{cm}}^{ee} > 6 \text{ GeV}$

NODE=S035R31

¹ BURCHAT 87 value is not independent of SCHMIDKE 86 value.

² Not independent of BERGER 85 $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(h^- \geq 1 \text{ neutrals} \nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(h^- \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$, and therefore not used in the fit.

³ Low energy experiments are not in average or fit because the systematic errors in background subtraction are judged to be large.

$\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-) \text{ ("3-prong")})/\Gamma_{\text{total}}$					Γ_{57}/Γ
$\Gamma_{57}/\Gamma = (\Gamma_{64} + \Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{90} + \Gamma_{94} + \Gamma_{98} + \Gamma_{99} + 0.285\Gamma_{140} + 0.285\Gamma_{142} + 0.9101\Gamma_{167} + 0.9101\Gamma_{169})/\Gamma$					

NODE=S035R31;LINKAGE=K

NODE=S035R31;LINKAGE=G

NODE=S035R31;LINKAGE=E

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
14.57 ± 0.07 OUR FIT		Error includes scale factor of 1.3.			
14.61 ± 0.06 OUR AVERAGE					
$\bullet \bullet \bullet$ We use the following data for averages but not for fits. $\bullet \bullet \bullet$					
14.556 \pm 0.105 \pm 0.076		¹ ACHARD	01D	L3	1992–1995 LEP runs
14.96 \pm 0.09 \pm 0.22	10.4k	AKERS	95Y	OPAL	1991–1994 LEP runs
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
14.652 \pm 0.067 \pm 0.086		SCHAEL	05C	ALEP	1991–1995 LEP runs
14.569 \pm 0.093 \pm 0.048	23k	² ABREU	01M	DLPH	1992–1995 LEP runs
14.22 \pm 0.10 \pm 0.37		³ BALEST	95C	CLEO	$E_{\text{cm}}^{ee} \approx 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
15.26 \pm 0.26 \pm 0.22		ACTON	92H	OPAL	Repl. by AKERS 95Y
13.3 \pm 0.3 \pm 0.8		⁴ ALBRECHT	92D	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
14.35 $^{+0.40}_{-0.45}$ \pm 0.24		DECAMP	92C	ALEP	1989–1990 LEP runs

NODE=S035B63

NODE=S035B63

NODE=S035B63

NOTFITTED

NOTFITTED

NOTFITTED

NODE=S035B63;LINKAGE=CH

NODE=S035B63;LINKAGE=M1

NODE=S035B63;LINKAGE=B

NODE=S035B63;LINKAGE=A

¹ The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau \rightarrow \text{"1-prong"})$ and $B(\tau \rightarrow \text{"5-prong"})$ are -0.978 and -0.19 respectively.

² The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau \rightarrow \text{1-prong})$ and $B(\tau \rightarrow \text{5-prong})$ are -0.98 and -0.08 respectively.

³ Not independent of BALEST 95C $B(h^- h^- h^+ \nu_\tau)$ and $B(h^- h^- h^+ \pi^0 \nu_\tau)$ values, and BORTOLETTO 93B $B(h^- h^- h^+ 2\pi^0 \nu_\tau)/B(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau)$ value.

⁴ This ALBRECHT 92D value is not independent of their $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)\Gamma(e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$ value.

$\Gamma(h^- h^- h^+ \nu_\tau)/\Gamma_{\text{total}}$

VALUE (%)	$\Gamma_{58}/\Gamma = (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + \Gamma_{64} + \Gamma_{90} + \Gamma_{98} + 0.017\Gamma_{167})/\Gamma$				Γ_{58}/Γ
	EVTS	DOCUMENT ID	TECN	COMMENT	
9.80 ± 0.07 OUR FIT	Error includes scale factor of 1.2.				

• • • We use the following data for averages but not for fits. • • •

7.6 ± 0.1 ± 0.5 7.5k ¹ ALBRECHT 96E ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

9.92 ± 0.10 ± 0.09	11.2k	² BUSKULIC	96	ALEP	Repl. by SCHAEEL 05C
9.49 ± 0.36 ± 0.63		DECAMP	92C	ALEP	Repl. by SCHAEEL 05C
8.7 ± 0.7 ± 0.3	694	³ BEHREND	90	CELL	$E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$
7.0 ± 0.3 ± 0.7	1566	⁴ BAND	87	MAC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
6.7 ± 0.8 ± 0.9		⁵ BURCHAT	87	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
6.4 ± 0.4 ± 0.9		⁶ RUCKSTUHL	86	DLCO	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
7.8 ± 0.5 ± 0.8	890	SCHMIDKE	86	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
8.4 ± 0.4 ± 0.7	1255	⁶ FERNANDEZ	85	MAC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
9.7 ± 2.0 ± 1.3		BEHREND	84	CELL	$E_{\text{cm}}^{\text{ee}} = 14,22 \text{ GeV}$

¹ ALBRECHT 96E not independent of ALBRECHT 93C $\Gamma(h^- h^- h^+ \nu_\tau(\text{ex. } K^0) \times \Gamma(\text{particle}^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}^2$ value.

² BUSKULIC 96 quote $B(h^- h^- h^+ \nu_\tau(\text{ex. } K^0)) = 9.50 \pm 0.10 \pm 0.11$. We add 0.42 to remove their K^0 correction and reduce the systematic error accordingly.

³ BEHREND 90 subtract 0.3% to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution to measured events.

⁴ BAND 87 subtract for charged kaon modes; not independent of FERNANDEZ 85 value.

⁵ BURCHAT 87 value is not independent of SCHMIDKE 86 value.

⁶ Value obtained by multiplying paper's $R = B(h^- h^- h^+ \nu_\tau)/B(3\text{-prong})$ by $B(3\text{-prong}) = 0.143$ and subtracting 0.3% for $K^*(892)$ background.

 $\Gamma(h^- h^- h^+ \nu_\tau(\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{59}/Γ

VALUE (%)	$\Gamma_{59}/\Gamma = (\Gamma_{64} + \Gamma_{90} + \Gamma_{98} + 0.017\Gamma_{167})/\Gamma$				Γ_{59}/Γ
	EVTS	DOCUMENT ID	TECN	COMMENT	
9.46 ± 0.06 OUR FIT	Error includes scale factor of 1.2.				

9.44 ± 0.14 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.

9.317 ± 0.090 ± 0.082 12.2k ¹ ABDALLAH 06A DLPH 1992–1995 LEP runs

9.51 ± 0.07 ± 0.20 37.7k BALEST 95C CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

9.87 ± 0.10 ± 0.24 ² AKERS 95Y OPAL 1991–1994 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

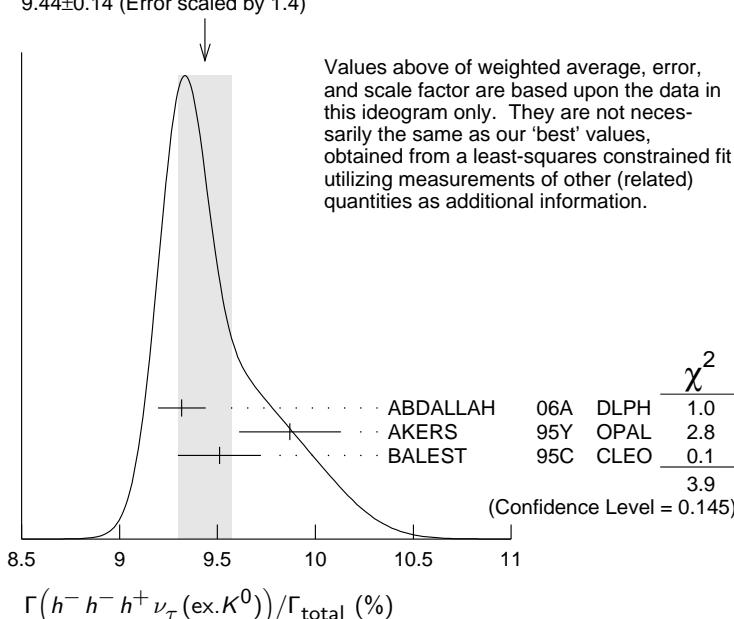
9.50 ± 0.10 ± 0.11 11.2k ³ BUSKULIC 96 ALEP Repl. by SCHAEEL 05C

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² Not independent of AKERS 95Y $B(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau(\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ and $B(h^- h^- h^+ \nu_\tau(\text{ex. } K^0))/B(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau(\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ values.

³ Not independent of BUSKULIC 96 $B(h^- h^- h^+ \nu_\tau)$ value.

WEIGHTED AVERAGE
9.44 ± 0.14 (Error scaled by 1.4)



NODE=S035R28

NODE=S035R28

NODE=S035R28

NOTFITTED

NODE=S035R28;LINKAGE=BB

NODE=S035R28;LINKAGE=EE

NODE=S035R28;LINKAGE=E

NODE=S035R28;LINKAGE=B

NODE=S035R28;LINKAGE=D

NODE=S035R28;LINKAGE=F

NODE=S035B62

NODE=S035B62

NODE=S035B62

NOTFITTED

NOTFITTED

NODE=S035B62;LINKAGE=AH

NODE=S035B62;LINKAGE=A

NODE=S035B62;LINKAGE=B

$$\frac{\Gamma(h^- h^- h^+ \nu_\tau(\text{ex. } K^0))}{\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau(\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))} = \frac{\Gamma_{59}}{\Gamma_{57}}$$

("3-prong")

$$\Gamma_{59}/\Gamma_{57} = (\Gamma_{64} + \Gamma_{90} + \Gamma_{98} + 0.017\Gamma_{167}) / (\Gamma_{64} + \Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{90} + \Gamma_{94} + \Gamma_{98} + \Gamma_{99} + 0.285\Gamma_{140} + 0.285\Gamma_{142} + 0.9101\Gamma_{167} + 0.9101\Gamma_{169})$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.6492 ± 0.0034 OUR FIT	Error includes scale factor of 1.1.		
0.660 ± 0.004 ± 0.014	AKERS	95Y	OPAL 1991–1994 LEP runs

NODE=S035B64
NODE=S035B64

$$\frac{\Gamma(h^- h^- h^+ \nu_\tau(\text{ex. } K^0, \omega))}{\Gamma_{\text{total}}} = \frac{\Gamma_{60}}{\Gamma}$$

VALUE (%)	DOCUMENT ID
9.42 ± 0.06 OUR FIT	Error includes scale factor of 1.2.

NODE=S035B71
NODE=S035B71

$$\frac{\Gamma(\pi^- \pi^+ \pi^- \nu_\tau)}{\Gamma_{\text{total}}} = \frac{\Gamma_{61}}{\Gamma} = (0.3431\Gamma_{35} + \Gamma_{64} + 0.017\Gamma_{167})/\Gamma$$

VALUE (%)	DOCUMENT ID
9.31 ± 0.06 OUR FIT	Error includes scale factor of 1.2.

NODE=S035C18
NODE=S035C18

$$\frac{\Gamma(\pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))}{\Gamma_{\text{total}}} = \frac{\Gamma_{62}}{\Gamma} = (\Gamma_{64} + 0.017\Gamma_{167})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
9.02 ± 0.06 OUR FIT				Error includes scale factor of 1.1.
8.77 ± 0.13 OUR AVERAGE				Error includes scale factor of 1.1.
8.42 ± 0.00 ± 0.26	8.9M	¹ LEE	10	BELL 666 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
8.83 ± 0.01 ± 0.13	1.6M	² AUBERT	08	BABR 342 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
9.13 ± 0.05 ± 0.46	43k	³ BRIERE	03	CLE3 $E_{\text{cm}}^{ee} = 10.6$ GeV

NODE=S035C19
NODE=S035C19

¹ Quoted statistical error is 0.003%. Correlation matrix for LEE 10 branching fractions:

- (1) $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))/\Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))/\Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$

NODE=S035C19;LINKAGE=LE

- | | | | |
|-----|--------|-------|--------|
| (1) | (2) | (3) | |
| (2) | 0.175 | | |
| (3) | 0.049 | 0.080 | |
| (4) | -0.053 | 0.035 | -0.008 |

² Correlation matrix for AUBERT 08 branching fractions:

- (1) $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))/\Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))/\Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$

NODE=S035C19;LINKAGE=AU

- | | | | |
|-----|-------|-------|-------|
| (1) | (2) | (3) | |
| (2) | 0.544 | | |
| (3) | 0.390 | 0.177 | |
| (4) | 0.031 | 0.093 | 0.087 |

³ 47% correlated with BRIERE 03 $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ and 71% correlated with $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

NODE=S035C19;LINKAGE=A

$$\frac{\Gamma(\pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0), \text{non-axial vector})}{\Gamma(\pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))} = \frac{\Gamma_{63}}{\Gamma_{62}} = \frac{\Gamma_{63}}{\Gamma_{64} + 0.017\Gamma_{167}}$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.261	95	¹ ACKERSTAFF	97R	OPAL 1992–1994 LEP runs

NODE=S035C50
NODE=S035C50

¹ Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))$ from non-axial vectors.

NODE=S035C50;LINKAGE=A

$$\frac{\Gamma(\pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0, \omega))}{\Gamma_{\text{total}}} = \frac{\Gamma_{64}}{\Gamma}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
8.99 ± 0.06 OUR FIT				Error includes scale factor of 1.1.
9.041 ± 0.060 ± 0.076	29k	¹ SCHAEL	05C	ALEP 1991–1995 LEP runs

NODE=S035C20
NODE=S035C20

¹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

NODE=S035C20;LINKAGE=SC

$\Gamma(h^- h^- h^+ \geq 1 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$	Γ_{65}/Γ	NODE=S035R30
$\Gamma_{65}/\Gamma = (0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{94} + \Gamma_{99} + 0.285\Gamma_{140} + 0.285\Gamma_{142} + 0.888\Gamma_{167} + 0.9101\Gamma_{169})/\Gamma$		NODE=S035R30
5.39 ± 0.07 OUR FIT Error includes scale factor of 1.2.		NODE=S035R30
• • • We do not use the following data for averages, fits, limits, etc. • • •		
5.6 ± 0.7 ± 0.3 352 1 BEHREND 90 CELL $E_{cm}^{ee} = 35 \text{ GeV}$		NOTFITTED
4.2 ± 0.5 ± 0.9 203 2 ALBRECHT 87L ARG $E_{cm}^{ee} = 10 \text{ GeV}$		NOTFITTED
6.1 ± 0.8 ± 0.9 3 BURCHAT 87 MRK2 $E_{cm}^{ee} = 29 \text{ GeV}$		NOTFITTED
7.6 ± 0.4 ± 0.9 4,5 RUCKSTUHL 86 DLCO $E_{cm}^{ee} = 29 \text{ GeV}$		NOTFITTED
4.7 ± 0.5 ± 0.8 530 6 SCHMIDKE 86 MRK2 $E_{cm}^{ee} = 29 \text{ GeV}$		NOTFITTED
5.6 ± 0.4 ± 0.7 5 FERNANDEZ 85 MAC $E_{cm}^{ee} = 29 \text{ GeV}$		NOTFITTED
6.2 ± 2.3 ± 1.7 BEHREND 84 CELL $E_{cm}^{ee} = 14,22 \text{ GeV}$		NOTFITTED
1 BEHREND 90 value is not independent of BEHREND 90 $B(3h\nu_\tau \geq 1 \text{ neutrals}) + B(5\text{-prong})$.		NODE=S035R30;LINKAGE=E
2 ALBRECHT 87L measure the product of branching ratios $B(3\pi^\pm \pi^0 \nu_\tau) B((e\bar{\nu} \text{ or } \mu\bar{\nu} \text{ or } \pi \text{ or } K \text{ or } \rho) \nu_\tau) = 0.029$ and use the PDG 86 values for the second branching ratio which sum to 0.69 ± 0.03 to get the quoted value.		NODE=S035R30;LINKAGE=C
3 BURCHAT 87 value is not independent of SCHMIDKE 86 value.		NODE=S035R30;LINKAGE=D
4 Contributions from kaons and from $>1\pi^0$ are subtracted. Not independent of (3-prong + $0\pi^0$) and (3-prong + $\geq 0\pi^0$) values.		NODE=S035R30;LINKAGE=A
5 Value obtained using paper's $R = B(h^- h^- h^+ \nu_\tau)/B(3\text{-prong})$ and current $B(3\text{-prong}) = 0.143$.		NODE=S035R30;LINKAGE=Q
6 Not independent of SCHMIDKE 86 $h^- h^- h^+ \nu_\tau$ and $h^- h^- h^+ (\geq 0\pi^0) \nu_\tau$ values.		NODE=S035R30;LINKAGE=S
$\Gamma(h^- h^- h^+ \geq 1\pi^0 \nu_\tau \text{ (ex. } K^0\text{)})/\Gamma_{\text{total}}$	Γ_{66}/Γ	
$\Gamma_{66}/\Gamma = (\Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{140} + 0.226\Gamma_{142} + 0.888\Gamma_{167} + 0.9101\Gamma_{169})/\Gamma$		
5.09 ± 0.06 OUR FIT Error includes scale factor of 1.2.		
5.10 ± 0.12 OUR AVERAGE		
• • • We use the following data for averages but not for fits. • • •		
5.106 ± 0.083 ± 0.103 10.1k 1 ABDALLAH 06A DLPH 1992–1995 LEP runs		NOTFITTED
5.09 ± 0.10 ± 0.23 2 AKERS 95Y OPAL 1991–1994 LEP runs		NOTFITTED
• • • We do not use the following data for averages, fits, limits, etc. • • •		
4.95 ± 0.29 ± 0.65 570 DECAMP 92C ALEP Repl. by SCHAEEL 05C		
1 See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.		NODE=S035B78;LINKAGE=AH
2 Not independent of AKERS 95Y $B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ (ex. } K_S^0 \rightarrow \pi^+ \pi^-)\text{)}$ and $B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ (ex. } K_S^0 \rightarrow \pi^+ \pi^-)\text{)}$ values.		NODE=S035B78;LINKAGE=A
$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau)/\Gamma_{\text{total}}$	Γ_{67}/Γ	
$\Gamma_{67}/\Gamma = (0.3431\Gamma_{40} + 0.3431\Gamma_{42} + \Gamma_{72} + \Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{142} + 0.888\Gamma_{167} + 0.017\Gamma_{169})/\Gamma$		
4.76 ± 0.06 OUR FIT Error includes scale factor of 1.2.		
• • • We do not use the following data for averages, fits, limits, etc. • • •		
4.45 ± 0.09 ± 0.07 6.1k 1 BUSKULIC 96 ALEP Repl. by SCHAEEL 05C		
1 BUSKULIC 96 quote $B(h^- h^- h^+ \pi^0 \nu_\tau \text{ (ex. } K^0\text{)}) = 4.30 \pm 0.09 \pm 0.09$. We add 0.15 to remove their K^0 correction and reduce the systematic error accordingly.		NODE=S035B76;LINKAGE=A
$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau \text{ (ex. } K^0\text{)})/\Gamma_{\text{total}}$	Γ_{68}/Γ	
$\Gamma_{68}/\Gamma = (\Gamma_{72} + \Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{142} + 0.888\Gamma_{167} + 0.017\Gamma_{169})/\Gamma$		
4.57 ± 0.06 OUR FIT Error includes scale factor of 1.2.		
4.45 ± 0.14 OUR AVERAGE Error includes scale factor of 1.2.		
4.545 ± 0.106 ± 0.103 8.9k 1 ABDALLAH 06A DLPH 1992–1995 LEP runs		NOTFITTED
4.23 ± 0.06 ± 0.22 7.2k BALEST 95C CLEO $E_{cm}^{ee} \approx 10.6 \text{ GeV}$		NOTFITTED
1 See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.		NODE=S035B53;LINKAGE=AH

$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$	$\Gamma_{69} / \Gamma = (\Gamma_{72} + \Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{142}) / \Gamma$
VALUE (%)	DOCUMENT ID
2.79 ± 0.08 OUR FIT	Error includes scale factor of 1.2.

NODE=S035B54
NODE=S035B54

$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$	$\Gamma_{70} / \Gamma = (0.3431\Gamma_{40} + \Gamma_{72} + 0.888\Gamma_{167} + 0.017\Gamma_{169}) / \Gamma$
VALUE (%)	DOCUMENT ID
4.62 ± 0.06 OUR FIT	Error includes scale factor of 1.2.

NODE=S035C22
NODE=S035C22

$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$	$\Gamma_{71} / \Gamma = (\Gamma_{72} + 0.888\Gamma_{167} + 0.017\Gamma_{169}) / \Gamma$			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
4.48 ± 0.06 OUR FIT	Error includes scale factor of 1.2.			

NODE=S035C23
NODE=S035C23

4.55 ± 0.13 OUR AVERAGE	Error includes scale factor of 1.6.
4.598 ± 0.057 ± 0.064	16k
4.19 ± 0.10 ± 0.21	2 EDWARDS 00A CLEO 4.7 fb ⁻¹ $E_{\text{cm}}^{\text{ee}} = 10.6$ GeV
1 SCHAEEL 05C quote (4.590 ± 0.057 ± 0.064)%.	We add 0.008% to remove their correction for $\tau^- \rightarrow \pi^- \pi^0 \nu_\tau \rightarrow \pi^- \pi^0 \pi^+ \pi^- \nu_\tau$ decays. See footnote to SCHAEEL 05C
2 EDWARDS 00A quote (4.19 ± 0.10) × 10 ⁻²	with a 5% systematic error.

$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$	Γ_{72} / Γ
VALUE (%)	DOCUMENT ID
2.70 ± 0.08 OUR FIT	Error includes scale factor of 1.2.

NODE=S035C23;LINKAGE=SC

$\Gamma(h^- \rho^0 \nu_\tau) / \Gamma(h^- h^- h^+ \pi^0 \nu_\tau)$	$\Gamma_{73} / \Gamma_{67}$			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.30 ± 0.04 ± 0.02	393	ALBRECHT 91D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV	

NODE=S035C24
NODE=S035C24

$\Gamma(h^- \rho^+ h^- \nu_\tau) / \Gamma(h^- h^- h^+ \pi^0 \nu_\tau)$	$\Gamma_{74} / \Gamma_{67}$			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.10 ± 0.03 ± 0.04	142	ALBRECHT 91D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV	

NODE=S035R98
NODE=S035R98

$\Gamma(h^- \rho^- h^+ \nu_\tau) / \Gamma(h^- h^- h^+ \pi^0 \nu_\tau)$	$\Gamma_{75} / \Gamma_{67}$			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.26 ± 0.05 ± 0.01	370	ALBRECHT 91D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV	

NODE=S035B0
NODE=S035B0

$\Gamma(h^- h^- h^+ \geq 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$	$\Gamma_{76} / \Gamma = (\Gamma_{79} + \Gamma_{80} + 0.226\Gamma_{140} + 0.888\Gamma_{169}) / \Gamma$			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.521 ± 0.032 OUR FIT				
0.561 ± 0.068 ± 0.095	1.3k	1 ABDALLAH 06A DLPH	1992–1995 LEP runs	

NODE=S035C03
NODE=S035C03

1	See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.
$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau) / \Gamma_{\text{total}}$	Γ_{77} / Γ
$\Gamma_{77} / \Gamma = (0.4307\Gamma_{47} + \Gamma_{79} + 0.226\Gamma_{140} + 0.888\Gamma_{169}) / \Gamma$	
0.508 ± 0.032 OUR FIT	

NODE=S035C03;LINKAGE=AH

$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$	Γ_{78} / Γ			
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.498 ± 0.032 OUR FIT				
0.435 ± 0.030 ± 0.035	2.6k	1 SCHAEEL 05C ALEP	1991–1995 LEP runs	

NODE=S035B77
NODE=S035B77

• • • We do not use the following data for averages, fits, limits, etc. • • •	
0.50 ± 0.07 ± 0.07	1.8k BUSKULIC 96 ALEP Repl. by SCHAEEL 05C
1	SCHAEL 05C quote (0.392 ± 0.030 ± 0.035)%. We add 0.043% to remove their correction for $\tau^- \rightarrow \pi^- \eta \pi^0 \nu_\tau \rightarrow \pi^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ and $\tau^- \rightarrow K^*(892)^- \eta \nu_\tau \rightarrow K^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ decays. See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

NODE=S035B59;LINKAGE=SC

$$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) = \Gamma_{78}/\Gamma_{56}$$

$$\Gamma_{78}/\Gamma_{56} = (\Gamma_{79} + 0.226\Gamma_{140} + 0.888\Gamma_{169}) / (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + 0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{64} + \Gamma_{72} + \Gamma_{79} + \Gamma_{80} + \Gamma_{90} + \Gamma_{94} + \Gamma_{98} + \Gamma_{99} + 0.285\Gamma_{140} + 0.285\Gamma_{142} + 0.9101\Gamma_{167} + 0.9101\Gamma_{169})$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.0328 ± 0.0021 OUR FIT				
0.034 ± 0.002 ± 0.003	668	BORTOLETTO93	CLEO	$E_{cm}^{ee} \approx 10.6 \text{ GeV}$

NODE=S035B25

NODE=S035B25

$$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0, \omega, \eta)) / \Gamma_{\text{total}} = \Gamma_{79}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID
10 ± 4 OUR FIT	

NODE=S035B72

NODE=S035B72

$$\Gamma(h^- h^- h^+ 3\pi^0 \nu_\tau) / \Gamma_{\text{total}} = \Gamma_{80}/\Gamma$$

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.3 ± 0.6 OUR FIT					Error includes scale factor of 1.2.
2.2 ± 0.3 ± 0.4	139		ANASTASSOV 01	CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 4.9	95	SCHAEL	05C	ALEP	1991-1995 LEP runs
$2.85 \pm 0.56 \pm 0.51$	57	ANDERSON	97	CLEO	Repl. by ANAS-TASSOV 01
11 ± 4 ± 5	440	¹ BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

¹ BUSKULIC 96 state their measurement is for $B(h^- h^- h^+ \geq 3\pi^0 \nu_\tau)$. We assume that $B(h^- h^- h^+ \geq 4\pi^0 \nu_\tau)$ is very small.

NODE=S035B57

NODE=S035B57

$$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}} = \Gamma_{81}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
2.07 ± 0.18 ± 0.37	¹ LEES	12X	BABR $468 \text{ fb}^{-1} E_{cm}^{ee} = 10.6 \text{ GeV}$

NODE=S035C85

NODE=S035C85

¹ Not independent of LEES 12X $\Gamma(\tau^- \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma$, $\Gamma(\tau^- \rightarrow \eta \pi^- \pi^0 \pi^0 \nu_\tau) / \Gamma$, $\Gamma(\tau^- \rightarrow \pi^- \omega 2\pi^0 \nu_\tau) / \Gamma$, and $\Gamma(\tau^- \rightarrow f_1(1285) \pi^- \nu_\tau \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau) / \Gamma$ values.

NODE=S035C85;LINKAGE=LE

$$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex. } K^0, \eta, f_1(1285))) / \Gamma_{\text{total}} = \Gamma_{82}/\Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
1.69 ± 0.08 ± 0.43	LEES	12X	BABR $468 \text{ fb}^{-1} E_{cm}^{ee} = 10.6 \text{ GeV}$

NODE=S035C86

NODE=S035C86

$$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex. } K^0, \eta, \omega, f_1(1285))) / \Gamma_{\text{total}} = \Gamma_{83}/\Gamma$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<5.8 × 10⁻⁵	90	¹ LEES	12X	BABR $468 \text{ fb}^{-1} E_{cm}^{ee} = 10.6 \text{ GeV}$

NODE=S035C87

NODE=S035C87

¹ LEES 12X also quote $(1.0 \pm 0.8 \pm 3.0) \times 10^{-5}$ for this branching fraction.

NODE=S035C87;LINKAGE=LE

$$\Gamma(K^- h^+ h^- \geq 0 \text{ neutrals} \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_{84}/\Gamma = (0.3431\Gamma_{37} + 0.3431\Gamma_{42} + \Gamma_{90} + \Gamma_{94} + \Gamma_{98} + \Gamma_{99} + 0.285\Gamma_{142}) / \Gamma$$

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
0.635 ± 0.024 OUR FIT				Error includes scale factor of 1.5.
<0.6	90	AIHARA	84C TPC	$E_{cm}^{ee} = 29 \text{ GeV}$

NODE=S035R34

NODE=S035R34

$$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$$

$$\Gamma_{85}/\Gamma = (\Gamma_{90} + \Gamma_{98}) / (\Gamma_{64} + 0.017\Gamma_{167})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
4.85 ± 0.22 OUR FIT				Error includes scale factor of 2.7.

NODE=S035C32

NODE=S035C32

5.44 ± 0.21 ± 0.53	7.9k	RICHICHI	99	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
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NODE=S035C32

NODE=S035C32

$$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$$

$$\Gamma_{86}/\Gamma = (\Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{142}) / \Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID
8.7 ± 1.2 OUR FIT	Error includes scale factor of 1.1.

NODE=S035C33

NODE=S035C33

$$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$$

$$\Gamma_{86}/\Gamma = (\Gamma_{94} + \Gamma_{99} + 0.226\Gamma_{142}) / (\Gamma_{72} + 0.888\Gamma_{167} + 0.017\Gamma_{169})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.94 ± 0.27 OUR FIT				

NODE=S035C34

NODE=S035C34

2.61 ± 0.45 ± 0.42	719	RICHICHI	99	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
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$\Gamma(K^-\pi^+\pi^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$

$\Gamma_{87}/\Gamma = (0.3431\Gamma_{37} + 0.3431\Gamma_{42} + \Gamma_{90} + \Gamma_{94} + 0.285\Gamma_{142})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.485 ± 0.021 OUR FIT		Error includes scale factor of 1.4.		
0.58 ± 0.15 ± 0.12	20	1 BAUER	94	TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.22 ± 0.16 ± 0.05	9	2 MILLS	85	DLCO $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

¹ We multiply 0.58% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

² Error correlated with MILLS 85 ($K\bar{K}\pi\nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.

 $\Gamma(K^-\pi^+\pi^- \geq 0\pi^0\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$

$\Gamma_{88}/\Gamma = (\Gamma_{90} + \Gamma_{94} + 0.226\Gamma_{142})/\Gamma$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
0.375 ± 0.019 OUR FIT	Error includes scale factor of 1.5.		

0.30 ± 0.05 OUR AVERAGE

• • • We use the following data for averages but not for fits. • • •

0.343 ± 0.073 ± 0.031	ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.275 ± 0.064	1 BARATE	98	ALEP	1991–1995 LEP runs

¹ Not independent of BARATE 98 $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ values.

 $\Gamma(K^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$

$\Gamma_{89}/\Gamma = (0.3431\Gamma_{37} + \Gamma_{90})/\Gamma$

VALUE (%)	DOCUMENT ID
0.349 ± 0.016 OUR FIT	Error includes scale factor of 1.9.

 $\Gamma(K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$

Γ_{90}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.294 ± 0.015 OUR FIT		Error includes scale factor of 2.2.		

0.290 ± 0.018 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.

0.330 ± 0.001 ± 0.016	794k	1 LEE	10	BELL $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
0.273 ± 0.002 ± 0.009	70k	2 AUBERT	08	BABR $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
0.415 ± 0.053 ± 0.040	269	ABBIENDI	04J	OPAL 1991–1995 LEP runs
0.384 ± 0.014 ± 0.038	3.5k	3 BRIERE	03	CLE3 $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
0.214 ± 0.037 ± 0.029		BARATE	98	ALEP 1991–1995 LEP runs

• • • We use the following data for averages but not for fits. • • •

0.346 ± 0.023 ± 0.056	158	4 RICHICHI	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.360 ± 0.082 ± 0.048		ABBIENDI	00D	OPAL 1990–1995 LEP runs
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¹ See footnote to LEE 10 $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ value.

² See footnote to AUBERT 08 $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

³ 47% correlated with BRIERE 03 $\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau$ and 34% correlated with $\tau^- \rightarrow K^-K^+\pi^-\nu_\tau$ because of a common 5% normalization error.

⁴ Not independent of RICHICHI 99

$\Gamma(\tau^- \rightarrow K^-h^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$, $\Gamma(\tau^- \rightarrow K^-K^+\pi^-\nu_\tau)/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^-h^+\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ values.

NODE=S035R41

NODE=S035R41

NODE=S035R41;LINKAGE=A

NODE=S035R41;LINKAGE=M

NODE=S035C40

NODE=S035C40

NOTFITTED

NOTFITTED

NODE=S035C40;LINKAGE=B8

NODE=S035C6

NODE=S035C6

NODE=S035C21

NODE=S035C21

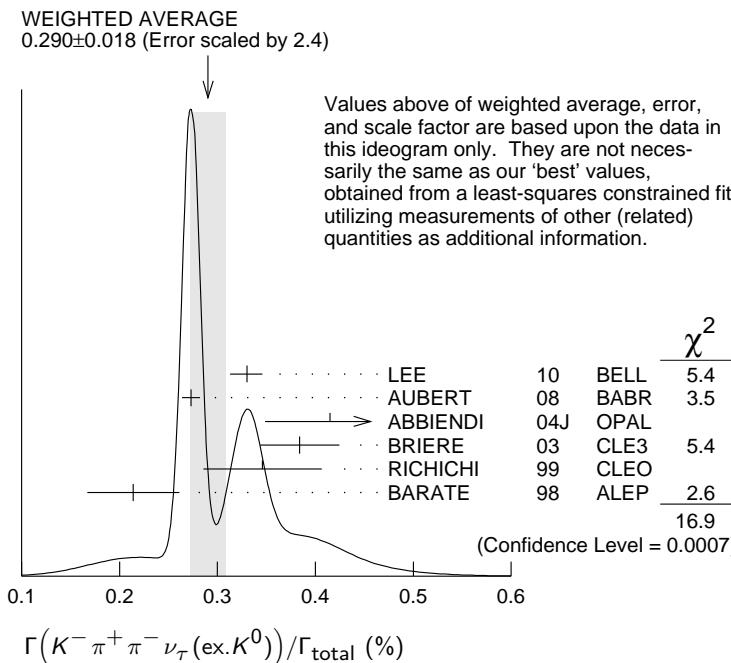
NOTFITTED

NODE=S035C21;LINKAGE=LE

NODE=S035C21;LINKAGE=AU

NODE=S035C21;LINKAGE=A

NODE=S035C21;LINKAGE=R1



$$\Gamma(K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)) / \Gamma(\pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))$$

$$\Gamma_{90}/\Gamma_{62} = \Gamma_{90}/(\Gamma_{64} + 0.017\Gamma_{167})$$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
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3.26±0.17 OUR FIT Error includes scale factor of 2.3.

• • • We use the following data for averages but not for fits. • • •

3.92±0.02^{+0.15}_{-0.16}	794k	1 LEE	10 BELL	$666 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
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1 Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$$\Gamma(K^- \rho^0 \nu_\tau \rightarrow K^- \pi^+ \pi^- \nu_\tau) / \Gamma(K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0))$$

$$\Gamma_{91}/\Gamma_{90}$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.48±0.14±0.10	1 ASNER	00B CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.39±0.14	2 BARATE	99R ALEP	1991–1995 LEP runs
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1 ASNER 00B assume $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)$ decays proceed only through $K\rho$ and $K^*\pi$ intermediate states. They assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)$ decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances, and assume $B(K_1(1270) \rightarrow K^*(892)\pi) = (16 \pm 5)\%$, $B(K_1(1270) \rightarrow K\rho) = (42 \pm 6)\%$, and $B(K_1(1400) \rightarrow K\rho) = 0$.

2 BARATE 99R assume $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau(\text{ex. } K^0)$ decays proceed only through $K\rho$ and $K^*\pi$ intermediate states. The quoted error is statistical only.

$$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_{92}/\Gamma = (0.3431\Gamma_{42} + \Gamma_{94} + 0.226\Gamma_{142}) / \Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID
13.5±1.4 OUR FIT	

$$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau(\text{ex. } K^0)) / \Gamma_{\text{total}}$$

$$\Gamma_{93}/\Gamma = (\Gamma_{94} + 0.226\Gamma_{142}) / \Gamma$$

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
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8.1±1.2 OUR FIT

7.3±1.2 OUR AVERAGE

7.4±0.8±1.1	1 ARMS	05 CLE3	$7.6 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
6.1±3.9±1.8	BARATE	98 ALEP	1991–1995 LEP runs

• • • We use the following data for averages but not for fits. • • •

7.5±2.6±1.8	2 RICHICHI	99 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<17	95	ABBIENDI	00D OPAL	1990–1995 LEP runs
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NODE=S035C76
NODE=S035C76

NOTFITTED

NODE=S035C76;LINKAGE=LE

NODE=S035C52
NODE=S035C52

NODE=S035C52;LINKAGE=BA

NODE=S035C52;LINKAGE=AB

NODE=S035C7
NODE=S035C7

NODE=S035C25
NODE=S035C25

NOTFITTED

¹ Not independent of ARMS 05 $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^- \omega \nu_\tau) / \Gamma_{\text{total}}$ values.

² Not independent of RICHICHI 99

$\Gamma(\tau^- \rightarrow K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$, $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BAEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \eta)) / \Gamma_{\text{total}}$

VALUE (units 10^{-4}) DOCUMENT ID

7.8±1.2 OUR FIT

Γ_{94}/Γ

NODE=S035C54
NODE=S035C54

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.7±0.5±0.8	833	ARMS	05	CLE3 $7.6 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

Γ_{95}/Γ

NODE=S035C60
NODE=S035C60

$\Gamma(K^- \pi^+ K^- \geq 0 \text{ neut. } \nu_\tau) / \Gamma_{\text{total}}$

<u>VALUE (%)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.09	95	BAUER	94	TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

Γ_{96}/Γ

NODE=S035B38
NODE=S035B38

$\Gamma(K^- K^+ \pi^- \geq 0 \text{ neut. } \nu_\tau) / \Gamma_{\text{total}}$

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.150±0.006 OUR FIT Error includes scale factor of 1.8.

0.203±0.031 OUR AVERAGE

$\Gamma_{97}/\Gamma = (\Gamma_{98} + \Gamma_{99}) / \Gamma$

NODE=S035B37
NODE=S035B37

$0.159 \pm 0.053 \pm 0.020$

ABBIENDI 00D OPAL 1990–1995 LEP runs

$0.15 \pm 0.09 \pm 0.03$

4 1 BAUER 94 TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

0.238 ± 0.042

2 BARATE 98 ALEP 1991–1995 LEP runs

1 We multiply 0.15% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

2 Not independent of BARATE 98 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ values.

$\Gamma(K^- K^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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1.44 ±0.05 OUR FIT Error includes scale factor of 1.9.

1.43 ±0.07 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.

$1.55 \pm 0.01 \pm 0.06$	108k	1 LEE	10 BELL	$666 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$1.346 \pm 0.010 \pm 0.036$	18k	2 AUBERT	08 BABR	$342 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$1.55 \pm 0.06 \pm 0.09$	932	3 BRIERE	03 CLE3	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$1.63 \pm 0.21 \pm 0.17$		BARATE	98 ALEP	1991–1995 LEP runs

• • • We use the following data for averages but not for fits. • • •

$0.87 \pm 0.56 \pm 0.40$

ABBIENDI 00D OPAL 1990–1995 LEP runs

$1.45 \pm 0.13 \pm 0.28$

2.3k 4 RICHICHI 99 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$2.2 \pm 1.7 \pm 0.5$

9 5 MILLS 85 DLCO $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

Γ_{98}/Γ

NODE=S035R40
NODE=S035R40

1 See footnote to LEE 10 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ value.

2 See footnote to AUBERT 08 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

3 71% correlated with BRIERE 03 $\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau$ and 34% correlated with $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

4 Not independent of RICHICHI 99 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BAEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

5 Error correlated with MILLS 85 ($K \pi \pi \pi^0 \nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.

NODE=S035C25;LINKAGE=AR

NODE=S035C25;LINKAGE=R1

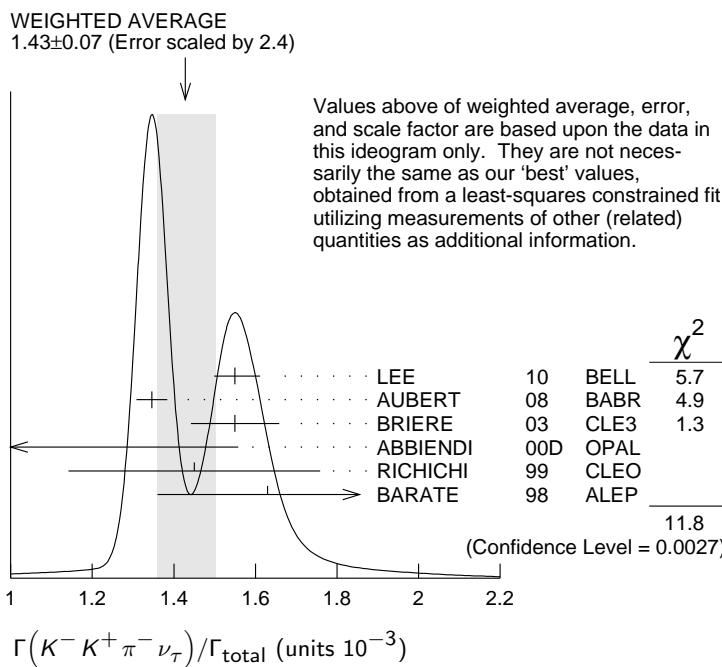
NODE=S035R40;LINKAGE=LE

NODE=S035R40;LINKAGE=AU

NODE=S035R40;LINKAGE=A

NODE=S035R40;LINKAGE=R1

NODE=S035R40;LINKAGE=M



$$\Gamma(K^- K^+ \pi^- \nu_\tau) / \Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) \quad \Gamma_{98} / \Gamma_{62} = \Gamma_{98} / (\Gamma_{64} + 0.017 \Gamma_{167})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.60±0.06 OUR FIT Error includes scale factor of 1.9.

1.83±0.05 OUR AVERAGE

$1.60 \pm 0.15 \pm 0.30$ 2.3k RICHICHI 99 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

$1.84 \pm 0.01 \pm 0.05$ 108k ¹ LEE 10 BELL $666 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_{99} / \Gamma$$

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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0.61±0.25 OUR FIT Error includes scale factor of 1.4.

0.60±0.18 OUR AVERAGE

$0.55 \pm 0.14 \pm 0.12$ 48 ARMS 05 CLE3 $7.6 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$7.5 \pm 2.9 \pm 1.5$ BARATE 98 ALEP 1991–1995 LEP runs

• • • We use the following data for averages but not for fits. • • •

$3.3 \pm 1.8 \pm 0.7$ 158 ¹ RICHICHI 99 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<27 95 ABBIENDI 00D OPAL 1990–1995 LEP runs

¹ Not independent of RICHICHI 99

$\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BAEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau) / \Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0))$$

$$\Gamma_{99} / \Gamma_{71} = \Gamma_{99} / (\Gamma_{72} + 0.888 \Gamma_{167} + 0.017 \Gamma_{169})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.14±0.05 OUR FIT Error includes scale factor of 1.4.

0.79±0.44±0.16 158 ¹ RICHICHI 99 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

1 RICHICHI 99 also quote a 95%CL upper limit of 0.0157 for this measurement.

$$\Gamma(K^- K^+ K^- \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_{100} / \Gamma$$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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2.1 ±0.8 OUR AVERAGE Error includes scale factor of 5.4.

$3.29 \pm 0.17^{+0.19}_{-0.20}$ 3.2k ¹ LEE 10 BELL $666 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$1.58 \pm 0.13 \pm 0.12$ 275 ² AUBERT 08 BABR $342 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 3.7 90 BRIERE 03 CLE3 $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

< 19 90 BARATE 98 ALEP 1991–1995 LEP runs

NODE=S035C35

NODE=S035C35

NOTFITTED

NODE=S035C35;LINKAGE=LE

NODE=S035C8

NODE=S035C8

NOTFITTED

NODE=S035C8;LINKAGE=R1

NODE=S035C36

NODE=S035C36

NODE=S035C36;LINKAGE=R1

NODE=S035C9

NODE=S035C9

¹ See footnote to LEE 10 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ value.

² See footnote to AUBERT 08 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(K^- K^+ K^- \nu_\tau) / \Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ $\Gamma_{100} / \Gamma_{62}$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.90 \pm 0.02^{+0.22}_{-0.23}$ 3.2k ¹ LEE 10 BELL 666 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$\Gamma(K^- K^+ K^- \nu_\tau (\text{ex. } \phi)) / \Gamma_{\text{total}}$ Γ_{101} / Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.5 \times 10^{-6}$	90	AUBERT	08	BABR 342 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(K^- K^+ K^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{102} / Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.8 \times 10^{-6}$	90	ARMS	05	CLE3 7.6 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(\pi^- K^+ \pi^- \geq 0 \text{ neut. } \nu_\tau) / \Gamma_{\text{total}}$ Γ_{103} / Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.25	95	BAUER	94	TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

$\Gamma(e^- e^- e^+ \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ Γ_{104} / Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
$2.8 \pm 1.4 \pm 0.4$	5	ALAM	96	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(\mu^- e^- e^+ \bar{\nu}_\mu \nu_\tau) / \Gamma_{\text{total}}$ Γ_{105} / Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT
<3.6	90	ALAM	96	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(3h^- 2h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^- \pi^+) (\text{"5-prong"}) / \Gamma_{\text{total}}$ Γ_{106} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.102 ± 0.004 OUR FIT				Error includes scale factor of 1.1.

0.107 ± 0.007 OUR AVERAGE Error includes scale factor of 1.1.

0.170 $\pm 0.022 \pm 0.026$		¹ ACHARD	01D L3	1992–1995 LEP runs
0.097 $\pm 0.005 \pm 0.011$	419	GIBAUT	94B CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
0.102 ± 0.029	13	BYLSMA	87 HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

• • • We use the following data for averages but not for fits. • • •

0.093 $\pm 0.009 \pm 0.012$		SCHAEL	05C ALEP	1991–1995 LEP runs
0.115 $\pm 0.013 \pm 0.006$	112	² ABREU	01M DLPH	1992–1995 LEP runs
0.119 $\pm 0.013 \pm 0.008$	119	³ ACKERSTAFF	99E OPAL	1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.26 $\pm 0.06 \pm 0.05$		ACTON	92H OPAL	$E_{\text{cm}}^{\text{ee}} = 88.2\text{--}94.2 \text{ GeV}$
0.10 $\pm 0.05 \pm 0.03$		DECAMP	92C ALEP	1989–1990 LEP runs
0.16 $\pm 0.13 \pm 0.04$		BEHREND	89B CELL	$E_{\text{cm}}^{\text{ee}} = 14\text{--}47 \text{ GeV}$
0.3 $\pm 0.1 \pm 0.2$		BARTEL	85F JADE	$E_{\text{cm}}^{\text{ee}} = 34.6 \text{ GeV}$
0.13 ± 0.04	10	BELTRAMI	85 HRS	Repl. by BYLSMA 87
0.16 $\pm 0.08 \pm 0.04$	4	BURCHAT	85 MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
1.0 ± 0.4	10	BEHREND	82 CELL	Repl. by BEHREND 89B

¹ The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau^- \rightarrow \text{"1-prong"})$ and $B(\tau^- \rightarrow \text{"3-prong"})$ are -0.082 and -0.19 respectively.

² The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau^- \rightarrow \text{1-prong})$ and $B(\tau^- \rightarrow \text{3-prong})$ are -0.08 and -0.08 respectively.

³ Not independent of ACKERSTAFF 99E $B(\tau^- \rightarrow 3h^- 2h^+ \nu_\tau (\text{ex. } K^0))$ and $B(\tau^- \rightarrow 3h^- 2h^+ \pi^0 \nu_\tau (\text{ex. } K^0))$ measurements.

NODE=S035C9;LINKAGE=LE

NODE=S035C9;LINKAGE=AU

NODE=S035C77;LINKAGE=LE

NODE=S035C67
NODE=S035C67

NODE=S035C62
NODE=S035C62

NODE=S035B36
NODE=S035B36

NODE=S035B65
NODE=S035B65

NODE=S035B66
NODE=S035B66

NODE=S035R33
NODE=S035R33
NODE=S035R33

NOTFITTED
NOTFITTED
NOTFITTED

NODE=S035R33;LINKAGE=CH

NODE=S035R33;LINKAGE=M1

NODE=S035R33;LINKAGE=A

$\Gamma(3h^-2h^+\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{107}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
8.39±0.35 OUR FIT				Error includes scale factor of 1.1.
8.32±0.35 OUR AVERAGE				
9.7 ± 1.5 ± 0.5	96	¹ ABDALLAH 06A	DLPH	1992–1995 LEP runs
8.56±0.05±0.42	34k	AUBERT,B 05W	BABR	232 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
7.2 ± 0.9 ± 1.2	165	² SCHael 05C	ALEP	1991–1995 LEP runs
9.1 ± 1.4 ± 0.6	97	ACKERSTAFF 99E	OPAL	1991–1995 LEP runs
7.7 ± 0.5 ± 0.9	295	GIBAUT 94B	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
6.4 ± 2.3 ± 1.0	12	ALBRECHT 88B	ARG	$E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
5.1 ± 2.0	7	BYLSMA 87	HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
8.0 ± 1.1 ± 1.3	58	BUSKULIC 96	ALEP	Repl. by SCHael 05C
6.7 ± 3.0	5	³ BELTRAMI 85	HRS	Repl. by BYLSMA 87

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² See footnote to SCHael 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

³ The error quoted is statistical only.

NODE=S035R38

NODE=S035R38

 $\Gamma(3\pi^-2\pi^+\nu_\tau(\text{ex.}K^0,\omega))/\Gamma_{\text{total}}$ Γ_{108}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
8.33±0.04±0.43		¹ LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
1 Not independent of LEES 12X $\Gamma(\tau^- \rightarrow f_1(1285)\pi^- \nu_\tau \rightarrow 3\pi^-2\pi^+\nu_\tau)/\Gamma$ and $\Gamma(\tau^- \rightarrow 3\pi^-2\pi^+\nu_\tau(\text{ex.}K^0,\omega,f_1(1285)))/\Gamma$ values.				

NODE=S035R38;LINKAGE=AH

NODE=S035R38;LINKAGE=SC

NODE=S035R38;LINKAGE=B

NODE=S035C88

NODE=S035C88

NODE=S035C88;LINKAGE=LE

 $\Gamma(3\pi^-2\pi^+\nu_\tau(\text{ex.}K^0,\omega,f_1(1285)))/\Gamma_{\text{total}}$ Γ_{109}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
7.68±0.04±0.40	69k	LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035C89

NODE=S035C89

 $\Gamma(K^-2\pi^-2\pi^+\nu_\tau)/\Gamma_{\text{total}}$ Γ_{110}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.4 \times 10^{-6}$	90	LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035C94

NODE=S035C94

 $\Gamma(K^+3\pi^-\pi^+\nu_\tau)/\Gamma_{\text{total}}$ Γ_{111}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<5.0 \times 10^{-6}$	90	LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035C95

NODE=S035C95

 $\Gamma(K^+K^-2\pi^-\pi^+\nu_\tau)/\Gamma_{\text{total}}$ Γ_{112}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.5 \times 10^{-7}$	90	LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035C96

NODE=S035C96

 $\Gamma(3h^-2h^+\pi^0\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{113}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.78±0.27 OUR FIT				

NODE=S035R39

NODE=S035R39

1.74±0.27 OUR AVERAGE

1.6 ± 1.2 ± 0.6	13	¹ ABDALLAH 06A	DLPH	1992–1995 LEP runs
2.1 ± 0.7 ± 0.9	95	² SCHael 05C	ALEP	1991–1995 LEP runs
1.7 ± 0.2 ± 0.2	231	ANASTASSOV 01	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
2.7 ± 1.8 ± 0.9	23	ACKERSTAFF 99E	OPAL	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.8 ± 0.7 ± 1.2	18	BUSKULIC 96	ALEP	Repl. by SCHael 05C
1.9 ± 0.4 ± 0.4	31	GIBAUT 94B	CLEO	Repl. by ANASTASSOV 01
5.1 ± 2.2	6	BYLSMA 87	HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
6.7 ± 3.0	5	³ BELTRAMI 85	HRS	Repl. by BYLSMA 87

¹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

² SCHael 05C quote $(1.4 \pm 0.7 \pm 0.9) \times 10^{-4}$. We add 0.7×10^{-4} to remove their correction for $\tau^- \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau \rightarrow 3\pi^-2\pi^+\pi^0\nu_\tau$ and $\tau^- \rightarrow K^*(892)^-\eta\nu_\tau \rightarrow 3\pi^-2\pi^+\pi^0\nu_\tau$ decays. See footnote to SCHael 05C $\Gamma(\tau^- \rightarrow e^-\bar{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

³ The error quoted is statistical only.

NODE=S035R39;LINKAGE=AH

NODE=S035R39;LINKAGE=SC

NODE=S035R39;LINKAGE=B

$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$	Γ_{114}/Γ	NODE=S035C90 NODE=S035C90	
<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>	
$1.65 \pm 0.05 \pm 0.09$	1 LEES	12X BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
1 Not independent of LEES 12X measurements of $\Gamma(\tau^- \rightarrow 2\pi^- \pi^+ \omega \nu_\tau) / \Gamma$, $\Gamma(\tau^- \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma$, and $\Gamma(\tau^- \rightarrow 3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex. } K^0, \eta, \omega, f_1(1285))) / \Gamma$.		NODE=S035C90;LINKAGE=LE	
$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex. } K^0, \eta, f_1(1285))) / \Gamma_{\text{total}}$	Γ_{115}/Γ	NODE=S035C91 NODE=S035C91	
<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>	
$1.11 \pm 0.04 \pm 0.09$	1 LEES	12X BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
1 Not independent of LEES 12X $\Gamma(\tau^- \rightarrow 2\pi^- \pi^+ \omega \nu_\tau) / \Gamma$ and $\Gamma(\tau^- \rightarrow 3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex. } K^0, \eta, \omega, f_1(1285))) / \Gamma$ values.		NODE=S035C91;LINKAGE=LE	
$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex. } K^0, \eta, \omega, f_1(1285))) / \Gamma_{\text{total}}$	Γ_{116}/Γ	NODE=S035C92 NODE=S035C92	
<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$0.36 \pm 0.03 \pm 0.09$	7.3k	LEES	12X BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\Gamma(K^- 2\pi^- 2\pi^+ \pi^0 \nu_\tau) / \Gamma_{\text{total}}$	Γ_{117}/Γ	NODE=S035C97 NODE=S035C97	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<1.9 \times 10^{-6}$	90	LEES	12X BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\Gamma(K^+ 3\pi^- \pi^+ \pi^0 \nu_\tau) / \Gamma_{\text{total}}$	Γ_{118}/Γ	NODE=S035C98 NODE=S035C98	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<8 \times 10^{-7}$	90	LEES	12X BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\Gamma(3h^- 2h^+ 2\pi^0 \nu_\tau) / \Gamma_{\text{total}}$	Γ_{119}/Γ	NODE=S035B44 NODE=S035B44	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<3.4 \times 10^{-6}$	90	AUBERT,B	06 BABR 232 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$<1.1 \times 10^{-4}$	90	GIBAUT	94B CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\Gamma((5\pi)^- \nu_\tau) / \Gamma_{\text{total}}$	Γ_{120}/Γ	NODE=S035B45 NODE=S035B45 NODE=S035B45 NEW	
$\Gamma_{120}/\Gamma = (\Gamma_{30} + \Gamma_{47} + \Gamma_{79} + \Gamma_{107} + 0.553\Gamma_{140} + 0.888\Gamma_{169}) / \Gamma$			
<u>VALUE (%)</u>		<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$0.76 \pm 0.05 \text{ OUR FIT}$			
$[0.77 \pm 0.05] \text{ OUR 2012 FIT}$			
• • • We use the following data for averages but not for fits. • • •			
$0.61 \pm 0.06 \pm 0.08$	1 GIBAUT	94B CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	NOTFITTED
1 Not independent of GIBAUT 94B $B(3h^- 2h^+ \nu_\tau)$, PROCARIO 93 $B(h^- 4\pi^0 \nu_\tau)$, and BORTOLETTO 93 $B(2h^- h^+ 2\pi^0 \nu_\tau) / B$ ("3prong") measurements. Result is corrected for η contributions.			NODE=S035B45;LINKAGE=A
$\Gamma(4h^- 3h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{"7-prong"}) / \Gamma_{\text{total}}$	Γ_{121}/Γ	NODE=S035R36 NODE=S035R36	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<3.0 \times 10^{-7}$	90	AUBERT,B	05F BABR 232 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$<1.8 \times 10^{-5}$	95	ACKERSTAFF	97J OPAL 1990–1995 LEP runs
$<2.4 \times 10^{-6}$	90	EDWARDS	97B CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<2.9 \times 10^{-4}$	90	BYLSMA	87 HRS $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
$\Gamma(4h^- 3h^+ \nu_\tau) / \Gamma_{\text{total}}$	Γ_{122}/Γ	NODE=S035C63 NODE=S035C63	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<4.3 \times 10^{-7}$	90	AUBERT,B	05F BABR 232 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\Gamma(4h^- 3h^+ \pi^0 \nu_\tau) / \Gamma_{\text{total}}$	Γ_{123}/Γ	NODE=S035C57 NODE=S035C57	
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
$<2.5 \times 10^{-7}$	90	AUBERT,B	05F BABR 232 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(X^-(S=-1)\nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{124}/\Gamma = (\Gamma_{10} + \Gamma_{16} + \Gamma_{23} + \Gamma_{28} + \Gamma_{35} + \Gamma_{40} + \Gamma_{90} + \Gamma_{94} + \Gamma_{142})/\Gamma$$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
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2.87±0.07 OUR FIT Error includes scale factor of 1.3.

• • • We use the following data for averages but not for fits. • • •

2.87±0.12

1 BARATE 99R ALEP 1991–1995 LEP runs

1 BARATE 99R perform a combined analysis of all ALEPH LEP 1 data on τ branching fraction measurements for decay modes having total strangeness equal to -1. $\Gamma(K^*(892)^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{125}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.42±0.18 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.1.19±0.15^{+0.13}_{-0.18}

104

ALBRECHT

95H

ARG

 $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

1.94±0.27±0.15

74

1 AKERS

94G

OPAL

 $E_{\text{cm}}^{\text{ee}} = 88\text{--}94 \text{ GeV}$

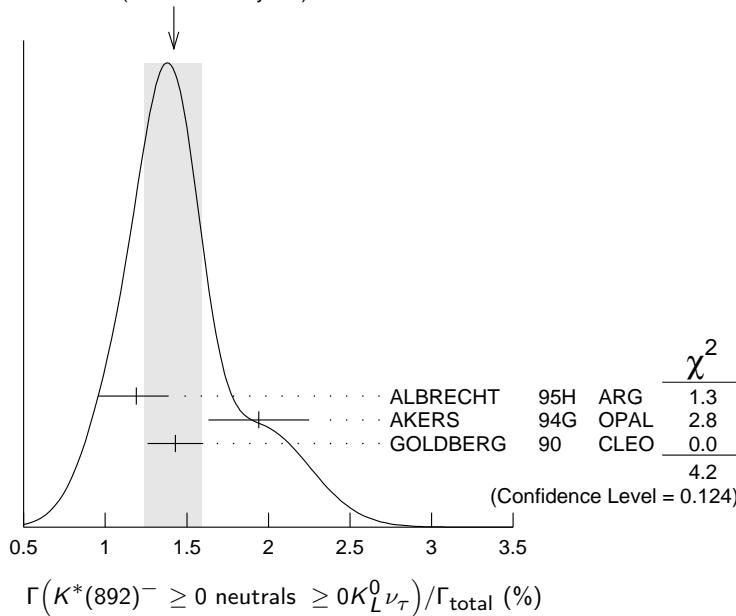
1.43±0.11±0.13

475

2 GOLDBERG

90

CLEO

 $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$ 1 AKERS 94G reject events in which a K_S^0 accompanies the $K^*(892)^-$. We do not correct for them.2 GOLDBERG 90 estimates that 10% of observed $K^*(892)$ are accompanied by a π^0 .WEIGHTED AVERAGE
1.42±0.18 (Error scaled by 1.4)

$$\Gamma(K^*(892)^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}} (\%)$$

 $\Gamma(K^*(892)^-\nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{126}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.20 ±0.07 OUR AVERAGE

Error includes scale factor of 1.8. See the ideogram below.

1.131±0.006±0.051 49k 1 EPIFANOV 07 BELL 351 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

1.326±0.063 BARATE 99R ALEP 1991–1995 LEP runs

1.11 ±0.12 2 COAN 96 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

1.42 ±0.22 ±0.09 3 ACCIARRI 95F L3 1991–1993 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.39 ±0.09 ±0.10 4 BUSKULIC 96 ALEP Repl. by BARATE 99R

1.45 ±0.13 ±0.11 273 5 BUSKULIC 94F ALEP Repl. by BUSKULIC 96

1.23 ±0.21 ±0.11 54 6 ALBRECHT 88L ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$ 1.9 ±0.3 ±0.4 44 7 TSCHIRHART 88 HRS $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$ 1.5 ±0.4 ±0.4 15 8 AIHARA 87C TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$ 1.3 ±0.3 ±0.3 31 YELTON 86 MRK2 $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$ 1.7 ±0.7 11 DORFAN 81 MRK2 $E_{\text{cm}}^{\text{ee}} = 4.2\text{--}6.7 \text{ GeV}$ 1 EPIFANOV 07 quote $B(\tau^- \rightarrow K^*(892)^-\nu_\tau) B(K^*(892)^- \rightarrow K_S^0 \pi^-) = (3.77 \pm 0.02(\text{stat}) \pm 0.12(\text{syst}) \pm 0.12(\text{mod})) \times 10^{-3}$. We add the systematic and model uncertainties in quadrature and divide by $B(K^*(892)^- \rightarrow K_S^0 \pi^-) = 0.3333$.2 Not independent of COAN 96 $B(\pi^- K^0 \nu_\tau)$ and BATTLE 94 $B(K^- \pi^0 \nu_\tau)$ measurements. $K\pi$ final states are consistent with and assumed to originate from $K^*(892)^-$ production.

NODE=S035C47

NODE=S035C47

NOTFITTED

NODE=S035C47;LINKAGE=A

NODE=S035R45

NODE=S035R45

NODE=S035R45;LINKAGE=B

NODE=S035R45;LINKAGE=A

NODE=S035R9

NODE=S035R9

NODE=S035R9;LINKAGE=EP

NODE=S035R9;LINKAGE=E

³This result is obtained from their $B(\pi^- \bar{K}^0 \nu_\tau)$ assuming all those decays originate in $K^*(892)^-$ decays.

⁴Not independent of BUSKULIC 96 $B(\pi^- \bar{K}^0 \nu_\tau)$ and $B(K^- \pi^0 \nu_\tau)$ measurements.

⁵BUSKULIC 94F obtain this result from BUSKULIC 94F $B(\bar{K}^0 \pi^- \nu_\tau)$ and BUSKULIC 94E $B(K^- \pi^0 \nu_\tau)$ assuming all of those decays originate in $K^*(892)^-$ decays.

⁶The authors divide by $\Gamma_2/\Gamma = 0.865$ to obtain this result.

⁷Not independent of TSCHIRHART 88 $\Gamma(\tau^- \rightarrow h^- \bar{K}^0 \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma$.

⁸Decay π^- identified in this experiment, is assumed in the others.

NODE=S035R9;LINKAGE=C

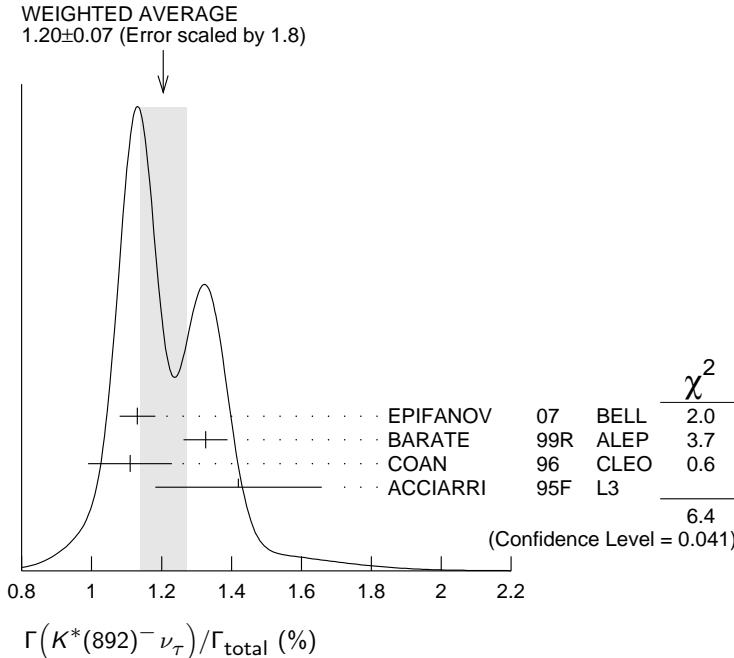
NODE=S035R9;LINKAGE=D

NODE=S035R9;LINKAGE=B

NODE=S035R9;LINKAGE=AL

NODE=S035R9;LINKAGE=A

NODE=S035R9;LINKAGE=AI



$$\Gamma(K^*(892)^- \nu_\tau) / \Gamma(\pi^- \pi^0 \nu_\tau)$$

VALUE	DOCUMENT ID	TECN	COMMENT	Γ_{126}/Γ_{14}
0.075±0.027	¹ ABREU	94K	DLPH LEP 1992 Z data	2.0

¹ ABREU 94K quote $B(\tau^- \rightarrow K^*(892)^- \nu_\tau)B(K^*(892)^- \rightarrow K^- \pi^0) / B(\tau^- \rightarrow \rho^- \nu_\tau) = 0.025 \pm 0.009$. We divide by $B(K^*(892)^- \rightarrow K^- \pi^0) = 0.333$ to obtain this result.

$$\Gamma(K^*(892)^- \nu_\tau \rightarrow \pi^- \bar{K}^0 \nu_\tau) / \Gamma(\pi^- \bar{K}^0 \nu_\tau)$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{127}/Γ_{35}
0.933±0.027	49k	EPIFANOV	07	BELL	$351 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$$\Gamma(K^*(892)^0 K^- \geq 0 \text{ neutrals} \nu_\tau) / \Gamma_{\text{total}}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{128}/Γ
0.32±0.08±0.12	119	GOLDBERG	90	CLEO	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$

$$\Gamma(K^*(892)^0 K^- \nu_\tau) / \Gamma_{\text{total}}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{129}/Γ
0.21 ± 0.04 OUR AVERAGE					

0.213±0.048 ¹ BARATE 98 ALEP 1991–1995 LEP runs

0.20 ± 0.05 ± 0.04 47 ALBRECHT 95H ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

¹ BARATE 98 measure the $K^- (\rho^0 \rightarrow \pi^+ \pi^-)$ fraction in $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ decays to be $(35 \pm 11)\%$ and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$ assuming the intermediate states are all $K^- \rho$ and $K^- K^*(892)^0$.

$$\Gamma(\bar{K}^*(892)^0 \pi^- \geq 0 \text{ neutrals} \nu_\tau) / \Gamma_{\text{total}}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_{130}/Γ
0.38±0.11±0.13	105	GOLDBERG	90	CLEO	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$

NODE=S035B49
NODE=S035B49

NODE=S035B49;LINKAGE=A

NODE=S035C68
NODE=S035C68

NODE=S035B6
NODE=S035B6

NODE=S035B60
NODE=S035B60

NODE=S035B60;LINKAGE=B8

NODE=S035B7
NODE=S035B7

$\Gamma(\bar{K}^*(892)^0 \pi^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{131}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.22 ± 0.05 OUR AVERAGE					
0.209 ± 0.058		1 BARATE 98	ALEP	1991–1995 LEP runs	NODE=S035B70
0.25 ± 0.10 ± 0.05	27	ALBRECHT 95H	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6 \text{ GeV}$	NODE=S035B70
1 BARATE 98 measure the $K^- K^*(892)^0$ fraction in $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$ decays to be $(87 \pm 13)\%$ and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$:					

$\Gamma(\bar{K}^*(892)\pi^- \nu_\tau \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$					Γ_{132}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.10 ± 0.04 OUR AVERAGE					
0.097 ± 0.044 ± 0.036		1 BARATE 99K	ALEP	1991–1995 LEP runs	NODE=S035C11
0.106 ± 0.037 ± 0.032		2 BARATE 98E	ALEP	1991–1995 LEP runs	NODE=S035C11
1 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.72 \pm 0.12 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by one minus this fraction to obtain the quoted result.					
2 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.64 \pm 0.09 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by one minus this fraction to obtain the quoted result.					

$\Gamma(K_1(1270)^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{133}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.47 ± 0.11 OUR AVERAGE					
0.48 ± 0.11		BARATE 99R	ALEP	1991–1995 LEP runs	NODE=S035B40
0.41 ^{+0.41} _{-0.35} ± 0.10	5	1 BAUER 94	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$	NODE=S035B40

¹ We multiply 0.41% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$\Gamma(K_1(1400)^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{134}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.17 ± 0.26 OUR AVERAGE		Error includes scale factor of 1.7.			
0.05 ± 0.17		BARATE 99R	ALEP	1991–1995 LEP runs	NODE=S035B41
0.76 ^{+0.40} _{-0.33} ± 0.20	11	1 BAUER 94	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$	NODE=S035B41

¹ We multiply 0.76% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$[\Gamma(K_1(1270)^- \nu_\tau) + \Gamma(K_1(1400)^- \nu_\tau)]/\Gamma_{\text{total}}$					$(\Gamma_{133} + \Gamma_{134})/\Gamma$
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
1.17^{+0.41}_{-0.37} ± 0.29	16	1 BAUER 94	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$	NODE=S035B42

¹ We multiply 1.17% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error. Not independent of BAUER 94 $B(K_1(1270)^- \nu_\tau)$ and BAUER 94 $B(K_1(1400)^- \nu_\tau)$ measurements.

$\Gamma(K_1(1270)^- \nu_\tau)/[\Gamma(K_1(1270)^- \nu_\tau) + \Gamma(K_1(1400)^- \nu_\tau)]$					$\Gamma_{133}/(\Gamma_{133} + \Gamma_{134})$
VALUE	DOCUMENT ID	TECN	COMMENT		
0.69 ± 0.15 OUR AVERAGE					
0.71 ± 0.16 ± 0.11		1 ABBIENDI 00D	OPAL	1990–1995 LEP runs	NODE=S035C41
0.66 ± 0.19 ± 0.13		2 ASNER 00B	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	NODE=S035C41

¹ ABBIENDI 00D assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ decays is dominated by the $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

² ASNER 00B assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0) decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

$\Gamma(K^*(1410)^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{135}/Γ
VALUE (units 10^{-3})	DOCUMENT ID	TECN	COMMENT		
$1.5^{+1.4}_{-1.0} \pm 0.2$	BARATE 99R	ALEP	1991–1995 LEP runs		NODE=S035C45

$\Gamma(K_0^*(1430)^- \nu_\tau)/\Gamma_{\text{total}}$					Γ_{136}/Γ
VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT	
<0.5	95	BARATE 99R	ALEP	1991–1995 LEP runs	NODE=S035C46

$\Gamma(K_2^*(1430)^-\nu_\tau)/\Gamma_{\text{total}}$						Γ_{137}/Γ
VALUE (%)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	
<0.3	95		TSCHIRHART	88	HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.33	95	1	ACCIARRI	95F	L3	1991–1993 LEP runs
<0.9	95	0	DORFAN	81	MRK2	$E_{\text{cm}}^{\text{ee}} = 4.2\text{--}6.7 \text{ GeV}$
1 ACCIARRI 95F quote $B(\tau^- \rightarrow K^*(1430)^- \rightarrow \pi^- \bar{K}^0 \nu_\tau) < 0.11\%$. We divide by $B(K^*(1430)^- \rightarrow \pi^- \bar{K}^0) = 0.33$ to obtain the limit shown.						

NODE=S035R10
NODE=S035R10

$\Gamma(a_0(980)^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}} \times B(a_0(980) \rightarrow K^0 K^-)$						$\Gamma_{138}/\Gamma \times B$
VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	
<2.8	90		GOLDBERG	90	CLEO	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$

NODE=S035R10;LINKAGE=A

$\Gamma(\eta\pi^-\nu_\tau)/\Gamma_{\text{total}}$						Γ_{139}/Γ
VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	
< 0.99	95		1 DEL-AMO-SA..11E	BABR	470 fb^{-1}	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 6.2	95		BUSKULIC	97C	ALEP	1991–1994 LEP runs
< 1.4	95	0	BARTEL	96	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
< 3.4	95		ARTUSO	92	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
< 90	95		ALBRECHT	88M	ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$
<140	90		BEHREND	88	CELL	$E_{\text{cm}}^{\text{ee}} = 14\text{--}46.8 \text{ GeV}$
<180	95		BARINGER	87	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.5 \text{ GeV}$
<250	90	0	COFFMAN	87	MRK3	$E_{\text{cm}}^{\text{ee}} = 3.77 \text{ GeV}$
510 $\pm 100 \pm 120$	65		DERRICK	87	HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
<100	95		GAN	87B	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

NODE=S035R8
NODE=S035B8

1 DEL-AMO-SANCHEZ 11E also quote $B(\tau^- \rightarrow \eta\pi^-\nu_\tau) = (3.4 \pm 3.4 \pm 2.1) \times 10^{-5}$.

NODE=S035R13
NODE=S035R13

$\Gamma(\eta\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$						Γ_{140}/Γ
VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	
1.39 ± 0.10 OUR FIT					Error includes scale factor of 1.4.	
1.38 ± 0.09 OUR AVERAGE					Error includes scale factor of 1.2.	
1.35 $\pm 0.03 \pm 0.07$	6.0k		INAMI	09	BELL	$490 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
1.8 $\pm 0.4 \pm 0.2$			BUSKULIC	97C	ALEP	1991–1994 LEP runs
1.7 $\pm 0.2 \pm 0.2$	125		ARTUSO	92	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 11.0	95		ALBRECHT	88M	ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$
< 21.0	95		BARINGER	87	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.5 \text{ GeV}$
42.0 $\pm 7.0 \pm 16.0$		1 GAN		87	MRK2	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

NODE=S035R13;LINKAGE=DE

NODE=S035R32
NODE=S035R32

1 Highly correlated with GAN 87 $\Gamma(\pi^- 3\pi^0\nu_\tau)/\Gamma(\text{total})$ value.

NODE=S035R32;LINKAGE=A

$\Gamma(\eta\pi^-\pi^0\pi^0\nu_\tau)/\Gamma_{\text{total}}$						Γ_{141}/Γ
VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	
1.81 ± 0.31 OUR AVERAGE						
[(1.5 $\pm 0.5) \times 10^{-4}$ OUR 2012 AVERAGE]						
2.01 $\pm 0.34 \pm 0.22$	381		LEES	12X	BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
1.5 ± 0.5	30	1	ANASTASSOV	01	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.4 $\pm 0.6 \pm 0.3$	15	2	BERGFELD	97	CLEO	Repl. by ANASTASSOV 01
< 4.3	95		ARTUSO	92	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
<120	95		ALBRECHT	88M	ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$

NODE=S035R78
NODE=S035R78

NEW

1 Weighted average of BERGFELD 97 and ANASTASSOV 01 value of $(1.5 \pm 0.6 \pm 0.3) \times 10^{-4}$ obtained using η 's reconstructed from $\eta \rightarrow \pi^+ \pi^- \pi^0$ decays.

NODE=S035R78;LINKAGE=AN

2 BERGFELD 97 reconstruct η 's using $\eta \rightarrow \gamma\gamma$ decays.

NODE=S035R78;LINKAGE=BF

$\Gamma(\eta K^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.52±0.08 OUR FIT					
1.52±0.08 OUR AVERAGE					
$1.42 \pm 0.11 \pm 0.07$ 690 DEL-AMO-SA..11E BABR 470 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$					
1.58±0.05±0.09	1.6k	INAMI	09	BELL	490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.9 $^{+1.3}_{-1.2}$ ± 0.7		BUSKULIC	97C	ALEP	1991–1994 LEP runs
2.6 ± 0.5 ± 0.5	85	BARTEL	96	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
< 4.7	95	ARTUSO	92	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

 Γ_{142}/Γ

NODE=S035B20
NODE=S035B20

 $\Gamma(\eta K^*(892)^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
1.38±0.15 OUR AVERAGE					
$1.34 \pm 0.12 \pm 0.09$ 245 ¹ INAMI 09 BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$					
2.90±0.80±0.42	25	BISHAI	99	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{143}/Γ

NODE=S035C26
NODE=S035C26

 $\Gamma(\eta K^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.48±0.12 OUR AVERAGE					
$0.46 \pm 0.11 \pm 0.04$ 270 INAMI 09 BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$					
1.77±0.56±0.71	36	BISHAI	99	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{144}/Γ

NODE=S035C27
NODE=S035C27

 $\Gamma(\eta K^-\pi^0(\text{non-}K^*(892))\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<3.5 × 10 ⁻⁵	90	INAMI	09	BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{145}/Γ

NODE=S035C72
NODE=S035C72

 $\Gamma(\eta \bar{K}^0 \pi^- \nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.93±0.15 OUR AVERAGE				
$0.88 \pm 0.14 \pm 0.06$ 161 ¹ INAMI 09 BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$				
2.20±0.70±0.22	15	² BISHAI	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{146}/Γ

NODE=S035C28
NODE=S035C28

¹ We multiply the INAMI 09 measurement $B(\tau^- \rightarrow \eta K_S^0 \pi^- \nu_\tau) = (0.44 \pm 0.07 \pm 0.03) \times 10^{-4}$ by 2 to obtain the listed value.

² We multiply the BISHAI 99 measurement $B(\tau^- \rightarrow \eta K_S^0 \pi^- \nu_\tau) = (1.10 \pm 0.35 \pm 0.11) \times 10^{-4}$ by 2 to obtain the listed value.

 $\Gamma(\eta \bar{K}^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<5.0 × 10 ⁻⁵	90	¹ INAMI	09	BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{147}/Γ

NODE=S035C73
NODE=S035C73

¹ We multiply the INAMI 09 measurement $B(\tau^- \rightarrow \eta K_S^0 \pi^- \nu_\tau) < 2.5 \times 10^{-5}$ by 2 to obtain the listed value.

 $\Gamma(\eta K^- K^0 \nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<9.0 × 10 ⁻⁶	90	¹ INAMI	09	BELL 490 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{148}/Γ

NODE=S035C74
NODE=S035C74

¹ We multiply the INAMI 09 measurement $B(\tau^- \rightarrow \eta K^- K_S^0 \nu_\tau) < 4.5 \times 10^{-6}$ by 2 to obtain the listed value.

 $\Gamma(\eta \pi^+ \pi^- \pi^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (%)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.3	90	ABACHI	87B	HRS $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

 Γ_{149}/Γ

NODE=S035R50
NODE=S035R50

$\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{150}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.25±0.13 OUR AVERAGE				
[(1.64 ± 0.12) $\times 10^{-4}$ OUR 2012 AVERAGE]				
2.25±0.07±0.12	4.6k	LEES	12x BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
2.3 ± 0.5	170	¹ ANASTASSOV 01	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.60±0.05±0.11	1.8 k	AUBERT	08AE BABR	Repl. by LEES 12x
3.4 $^{+0.6}_{-0.5}$ ± 0.6	89	² BERGFELD	97 CLEO	Repl. by ANASTASSOV 01

¹ Weighted average of BERGFELD 97 and ANASTASSOV 01 measurements using η 's reconstructed from $\eta \rightarrow \pi^+\pi^-\pi^0$ and $\eta \rightarrow 3\pi^0$ decays.

² BERGFELD 97 reconstruct η 's using $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow 3\pi^0$ decays.

 $\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0,f_1(1285)))/\Gamma_{\text{total}}$ Γ_{151}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
0.99±0.09±0.13	¹ LEES	12x BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
¹ LEES 12x obtain this result by subtracting their $B(\tau^- \rightarrow f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)$ measurement from their $B(\tau^- \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ measurement.			

 $\Gamma(\eta a_1(1260)^-\nu_\tau \rightarrow \eta\pi^-\rho^0\nu_\tau)/\Gamma_{\text{total}}$ Γ_{152}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.9 \times 10^{-4}$	90	BERGFELD	97 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\eta\eta\pi^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{153}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<7.4 \times 10^{-6}$	90	INAMI	09 BELL	$490 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.1 \times 10^{-4}$	95	ARTUSO	92 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
$<8.3 \times 10^{-3}$	95	ALBRECHT	88M ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$

 $\Gamma(\eta\eta\pi^0\nu_\tau)/\Gamma_{\text{total}}$ Γ_{154}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
< 2.0	95	ARTUSO	92 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<90	95	ALBRECHT	88M ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$

 $\Gamma(\eta\eta K^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{155}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.0 \times 10^{-6}$	90	INAMI	09 BELL	$490 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\eta'(958)\pi^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{156}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.0 \times 10^{-6}$ (CL = 90%)	[$<7.2 \times 10^{-6}$ (CL = 90%) OUR 2012 BEST LIMIT]			
$<4.0 \times 10^{-6}$	90	LEES	12x BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<7.2 \times 10^{-6}$	90	AUBERT	08AE BABR	$384 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.4 \times 10^{-5}$	90	BERGFELD	97 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\eta'(958)\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ Γ_{157}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.2 \times 10^{-5}$ (CL = 90%)	[$<8.0 \times 10^{-5}$ (CL = 90%) OUR 2012 BEST LIMIT]			
$<1.2 \times 10^{-5}$	90	LEES	12x BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<8.0 \times 10^{-5}$	90	BERGFELD	97 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\eta'(958)K^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{158}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.4 \times 10^{-6}$	90	LEES	12x BABR	$468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035B89

NODE=S035B89

NEW

NODE=S035B89;LINKAGE=AN

NODE=S035B89;LINKAGE=BF

NODE=S035C81

NODE=S035C81

NODE=S035C81;LINKAGE=LE

NODE=S035B90

NODE=S035B90

NODE=S035R79

NODE=S035R79

NODE=S035R80

NODE=S035R80

NODE=S035B91

NODE=S035B91

NODE=S035B92

NODE=S035B92

NODE=S035C93

NODE=S035C93

$\Gamma(\phi\pi^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-5})</u>	<u>CL %</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.42±0.55±0.25		344	AUBERT	08	BABR 342 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 20	90	¹ AVERY	97	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
< 35	90	ALBRECHT	95H	ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

¹ Avery 97 limit varies from $(1.2\text{--}2.0) \times 10^{-4}$ depending on decay model assumptions.

 Γ_{159}/Γ

NODE=S035B61
NODE=S035B61

 $\Gamma(\phi K^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-5})</u>	<u>CL %</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.70±0.33 OUR AVERAGE					Error includes scale factor of 1.3.
3.39±0.20±0.28		274	AUBERT	08	BABR 342 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
4.05±0.25±0.26		551	INAMI	06	BELL 401 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 6.7	90	¹ AVERY	97	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ Avery 97 limit varies from $(5.4\text{--}6.7) \times 10^{-5}$ depending on decay model assumptions.

 Γ_{160}/Γ

NODE=S035B82
NODE=S035B82

 $\Gamma(f_1(1285)\pi^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.9 ±0.5 OUR AVERAGE				Error includes scale factor of 1.9. $[(3.6 \pm 0.7) \times 10^{-4}$ OUR 2012 AVERAGE]
4.73±0.28±0.45	3.7k	¹ LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
3.60±0.18±0.23	2.5k	² LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.19±0.18±1.00	1.3 k	³ AUBERT	08AE	BABR Repl. by LEES 12X
3.9 ±0.7 ±0.5	1.4 k	⁴ AUBERT,B	05W	BABR Repl. by LEES 12X
5.8 ^{+1.4} _{-1.3}	54	⁵ BERGFELD	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ LEES 12X obtain this value by dividing their $B(\tau^- \rightarrow f_1(1285)\pi^-\nu_\tau \rightarrow 3\pi^-2\pi^+\nu_\tau)$ measurement by the PDG 12 value of $B(f_1(1285) \rightarrow 2\pi^+2\pi^-) = 0.111^{+0.007}_{-0.006}$.

² LEES 12X obtain this value by dividing their $B(\tau^- \rightarrow f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)$ measurement by 2/3 of the PDG 12 value of $B(f_1(1285) \rightarrow \eta\pi\pi) = 0.524^{+0.019}_{-0.021}$.

³ AUBERT 08AE obtain this value by dividing their $B(\tau^- \rightarrow f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)$ measurement by the PDG 06 value of $B(f_1(1285) \rightarrow \eta\pi^-\pi^+) = 0.35 \pm 0.11$. The quote $(3.19 \pm 0.18 \pm 0.16 \pm 0.99) \times 10^{-4}$ where the final error is due to the uncertainty on $B(f_1(1285) \rightarrow \eta\pi^-\pi^+)$. We combine the two systematic errors in quadrature.

⁴ AUBERT,B 05W use the $f_1(1285) \rightarrow 2\pi^+2\pi^-$ decay mode and the PDG 04 value of $B(f_1(1285) \rightarrow 2\pi^+2\pi^-) = 0.110^{+0.007}_{-0.006}$.

⁵ BERGFELD 97 use the $f_1(1285) \rightarrow \eta\pi^+\pi^-$ decay mode.

 Γ_{161}/Γ

NODE=S035B93
NODE=S035B93

NEW

OCCUR=2

NODE=S035B93;LINKAGE=LE

NODE=S035B93;LINKAGE=LS

NODE=S035B93;LINKAGE=AB

NODE=S035B93;LINKAGE=AU

NODE=S035B93;LINKAGE=BE

NODE=S035C69
NODE=S035C69

NEW

 $\Gamma(f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.18±0.07 OUR AVERAGE				Error includes scale factor of 1.3. $[(1.11 \pm 0.08) \times 10^{-4}$ OUR 2012 AVERAGE]
1.26±0.06±0.06	2.5k	LEES	12X	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
1.11±0.06±0.05	1.3 k	AUBERT	08AE	BABR 384 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{162}/Γ

NODE=S035B94
NODE=S035B94

NEW

 $\Gamma(f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex. } K^0))$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.69±0.01±0.05	¹ AUBERT	08AE	BABR 384 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.55±0.14 BERGFELD 97 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹ Not independent of AUBERT 08AE $B(\tau^- \rightarrow f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)$ and $B(\tau^- \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex. } K^0))$ values.

 $\Gamma_{162}/\Gamma_{150}$

NODE=S035B94;LINKAGE=AU

 $\Gamma(f_1(1285)\pi^-\nu_\tau \rightarrow 3\pi^-2\pi^+\nu_\tau)/\Gamma_{\text{total}}$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
(0.520±0.031±0.037) × 10⁻⁴	LEES	12X	BABR	468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{163}/Γ

NODE=S035C82
NODE=S035C82

$\Gamma(\pi(1300)^-\nu_\tau \rightarrow (\rho\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau)/\Gamma_{\text{total}}$					Γ_{164}/Γ	NODE=S035C42 NODE=S035C42
VALUE	CL%	DOCUMENT ID	TECN	COMMENT		
$<1.0 \times 10^{-4}$	90	ASNER	00	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\Gamma(\pi(1300)^-\nu_\tau \rightarrow ((\pi\pi)_{S-\text{wave}}\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau)/\Gamma_{\text{total}}$					Γ_{165}/Γ	NODE=S035C43 NODE=S035C43
VALUE	CL%	DOCUMENT ID	TECN	COMMENT		
$<1.9 \times 10^{-4}$	90	ASNER	00	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\Gamma(h^-\omega \geq 0 \text{ neutrals} \nu_\tau)/\Gamma_{\text{total}}$					Γ_{166}/Γ	NODE=S035R15 NODE=S035R15 NODE=S035R15
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT		
2.41±0.09 OUR FIT	Error includes scale factor of 1.2.					
• • • We use the following data for averages but not for fits. • • •						
1.65±0.3 ±0.2	1513	ALBRECHT	88M ARG	$E_{\text{cm}}^{\text{ee}} \approx 10 \text{ GeV}$		NOTFITTED
$\Gamma(h^-\omega \nu_\tau)/\Gamma_{\text{total}}$					Γ_{167}/Γ	NODE=S035R23 NODE=S035R23
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT		
2.00±0.08 OUR FIT	Error includes scale factor of 1.3.					
1.92±0.07 OUR AVERAGE						
1.91±0.07±0.06	5803	BUSKULIC	97C ALEP	1991–1994 LEP runs		
1.60±0.27±0.41	139	BARINGER	87 CLEO	$E_{\text{cm}}^{\text{ee}} = 10.5 \text{ GeV}$		
• • • We use the following data for averages but not for fits. • • •						
1.95±0.07±0.11	2223	¹ BALEST	95C CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$		NOTFITTED
¹ Not independent of BALEST 95C $B(\tau^- \rightarrow h^-\omega\nu_\tau)/B(\tau^- \rightarrow h^-h^+\pi^0\nu_\tau)$ value.						NODE=S035R23;LINKAGE=A
$\Gamma(h^-\omega\nu_\tau)/\Gamma(h^-h^+\pi^0\nu_\tau(\text{ex. } K^0))$					Γ_{167}/Γ_{68}	NODE=S035R14 NODE=S035R14 NODE=S035R14
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT		
0.437±0.017 OUR FIT	Error includes scale factor of 1.2.					
0.453±0.019 OUR AVERAGE						
0.431±0.033	2350	¹ BUSKULIC	96 ALEP	LEP 1991–1993 data		
0.464±0.016±0.017	2223	² BALEST	95C CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$		
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.37 ± 0.05 ± 0.02	458	³ ALBRECHT	91D ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$		
¹ BUSKULIC 96 quote the fraction of $\tau^- \rightarrow h^-\omega\nu_\tau$ (ex. K^0) decays which originate in a $h^-\omega$ final state = 0.383 ± 0.029 . We divide this by the $\omega(782) \rightarrow \pi^+\pi^-\pi^0$ branching fraction (0.888).						NODE=S035R14;LINKAGE=D
² BALEST 95C quote the fraction of $\tau^- \rightarrow h^-\omega\nu_\tau$ (ex. K^0) decays which originate in a $h^-\omega$ final state equals $0.412 \pm 0.014 \pm 0.015$. We divide this by the $\omega(782) \rightarrow \pi^+\pi^-\pi^0$ branching fraction (0.888).						NODE=S035R14;LINKAGE=B
³ ALBRECHT 91D quote the fraction of $\tau^- \rightarrow h^-\omega\nu_\tau$ decays which originate in a $\pi^-\omega$ final state equals $0.33 \pm 0.04 \pm 0.02$. We divide this by the $\omega(782) \rightarrow \pi^+\pi^-\pi^0$ branching fraction (0.888).						NODE=S035R14;LINKAGE=C
$\Gamma(K^-\omega\nu_\tau)/\Gamma_{\text{total}}$					Γ_{168}/Γ	NODE=S035C61 NODE=S035C61
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT		
4.1±0.6±0.7	500	ARMS	05 CLE3	$7.6 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$		
$\Gamma(h^-\omega\pi^0\nu_\tau)/\Gamma_{\text{total}}$					Γ_{169}/Γ	NODE=S035B58 NODE=S035B58
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT		
0.41±0.04 OUR FIT						
0.43±0.06±0.05	7283	BUSKULIC	97C ALEP	1991–1994 LEP runs		
$\Gamma(h^-\omega\pi^0\nu_\tau)/\Gamma(h^-h^-h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0\nu_\tau)$					Γ_{169}/Γ_{56}	NODE=S035B26 NODE=S035B26
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT		
0.0271±0.0028 OUR FIT						
• • • We use the following data for averages but not for fits. • • •						
0.028 ± 0.003 ± 0.003	430	¹ BORTOLETTO	93 CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$		NOTFITTED
¹ Not independent of BORTOLETTO 93 $\Gamma(\tau^- \rightarrow h^-\omega\pi^0\nu_\tau)/\Gamma(\tau^- \rightarrow h^-h^-h^+\pi^0\nu_\tau)$ (ex. K^0) value.						NODE=S035B26;LINKAGE=A

$\Gamma(h^-\omega\pi^0\nu_\tau)/\Gamma(h^-h^-h^+2\pi^0\nu_\tau(\text{ex.}K^0))$	Γ_{169}/Γ_{78}	NODE=S035B27
$\Gamma_{169}/\Gamma_{78} = \Gamma_{169}/(\Gamma_{79} + 0.226\Gamma_{140} + 0.888\Gamma_{169})$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
0.83±0.08 OUR FIT		
0.81±0.06±0.06	BORTOLETTO93	CLEO $E_{cm}^{ee} \approx 10.6$ GeV
$\Gamma(h^-\omega 2\pi^0\nu_\tau)/\Gamma_{\text{total}}$	Γ_{170}/Γ	NODE=S035B96
<u>VALUE (units 10^{-4})</u> <u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
1.4 ±0.4 ±0.3 53	ANASTASSOV 01	CLEO $E_{cm}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •		
1.89 ^{+0.74} _{-0.67} ±0.40 19	ANDERSON 97	CLEO Repl. by ANASTASSOV 01
$\Gamma(\pi^-\omega 2\pi^0\nu_\tau)/\Gamma_{\text{total}}$	Γ_{171}/Γ	NODE=S035C84
<u>VALUE (units 10^{-4})</u> <u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
0.73±0.12±0.12 1.1k	LEES	12X BABR $468 \text{ fb}^{-1} E_{cm}^{ee} = 10.6$ GeV
$\Gamma(h^-2\omega\nu_\tau)/\Gamma_{\text{total}}$	Γ_{172}/Γ	NODE=S035C66
<u>VALUE</u> <u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
<5.4 × 10⁻⁷ 90	AUBERT,B 06	BABR $232 \text{ fb}^{-1} E_{cm}^{ee} = 10.6$ GeV
$\Gamma(2h^-h^+\omega\nu_\tau)/\Gamma_{\text{total}}$	Γ_{173}/Γ	NODE=S035C53
<u>VALUE (units 10^{-4})</u> <u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
1.2±0.2±0.1 110	ANASTASSOV 01	CLEO $E_{cm}^{ee} = 10.6$ GeV
$\Gamma(2\pi^-\pi^+\omega\nu_\tau)/\Gamma_{\text{total}}$	Γ_{174}/Γ	NODE=S035C83
<u>VALUE (units 10^{-4})</u> <u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
0.84±0.04±0.06 2.4k	LEES	12X BABR $468 \text{ fb}^{-1} E_{cm}^{ee} = 10.6$ GeV
$\Gamma(e^-\gamma)/\Gamma_{\text{total}}$	Γ_{175}/Γ	NODE=S035R54
Test of lepton family number conservation.		
<u>VALUE</u> <u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
<3.3 × 10⁻⁸ 90	AUBERT	10B BABR $516 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •		
<1.2 × 10 ⁻⁷ 90	HAYASAKA 08	BELL $535 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
<1.1 × 10 ⁻⁷ 90	AUBERT 06C	BABR $232 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
<3.9 × 10 ⁻⁷ 90	HAYASAKA 05	BELL $86.7 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
<2.7 × 10 ⁻⁶ 90	EDWARDS 97	CLEO
<1.1 × 10 ⁻⁴ 90	ABREU 95U	DLPH 1990–1993 LEP runs
<1.2 × 10 ⁻⁴ 90	ALBRECHT 92K	ARG $E_{cm}^{ee} = 10$ GeV
<2.0 × 10 ⁻⁴ 90	KEH 88	CBAL $E_{cm}^{ee} = 10$ GeV
<6.4 × 10 ⁻⁴ 90	HAYES 82	MRK2 $E_{cm}^{ee} = 3.8\text{--}6.8$ GeV
$\Gamma(\mu^-\gamma)/\Gamma_{\text{total}}$	Γ_{176}/Γ	NODE=S035R53
Test of lepton family number conservation.		
<u>VALUE</u> <u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u> <u>COMMENT</u>
< 4.4 × 10⁻⁸ 90	AUBERT	10B BABR $516 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •		
< 4.5 × 10 ⁻⁸ 90	HAYASAKA 08	BELL $535 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
< 6.8 × 10 ⁻⁸ 90	AUBERT,B 05A	BABR $232 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
< 3.1 × 10 ⁻⁷ 90	ABE 04B	BELL $86.3 \text{ fb}^{-1}, E_{cm}^{ee} = 10.6$ GeV
< 1.1 × 10 ⁻⁶ 90	AHMED 00	CLEO $E_{cm}^{ee} = 10.6$ GeV
< 3.0 × 10 ⁻⁶ 90	EDWARDS 97	CLEO
< 6.2 × 10 ⁻⁵ 90	ABREU 95U	DLPH 1990–1993 LEP runs
< 0.42 × 10 ⁻⁵ 90	BEAN 93	CLEO $E_{cm}^{ee} = 10.6$ GeV
< 3.4 × 10 ⁻⁵ 90	ALBRECHT 92K	ARG $E_{cm}^{ee} = 10$ GeV
<55 × 10 ⁻⁵ 90	HAYES 82	MRK2 $E_{cm}^{ee} = 3.8\text{--}6.8$ GeV

$\Gamma(e^- \pi^0)/\Gamma_{\text{total}}$ Γ_{177}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 8.0 \times 10^{-8}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 1.3 \times 10^{-7}$	90	AUBERT	07I	BABR $339 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-7}$	90	ENARI	05	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.7 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 17 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 14 \times 10^{-5}$	90	KEH	88	CBAL $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 210 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

 $\Gamma(\mu^- \pi^0)/\Gamma_{\text{total}}$ Γ_{178}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.1 \times 10^{-7}$	90	AUBERT	07I	BABR $339 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 1.2 \times 10^{-7}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.1 \times 10^{-7}$	90	ENARI	05	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.0 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 82 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

 $\Gamma(e^- K_S^0)/\Gamma_{\text{total}}$ Γ_{179}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.6 \times 10^{-8}$	90	MIYAZAKI	10A	BELL $671 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 3.3 \times 10^{-8}$	90	AUBERT	09D	BABR $469 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 5.6 \times 10^{-8}$	90	MIYAZAKI	06A	BELL $281 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 9.1 \times 10^{-7}$	90	CHEN	02C	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.3 \times 10^{-3}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

 $\Gamma(\mu^- K_S^0)/\Gamma_{\text{total}}$ Γ_{180}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.3 \times 10^{-8}$	90	MIYAZAKI	10A	BELL $671 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 4.0 \times 10^{-8}$	90	AUBERT	09D	BABR $469 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.9 \times 10^{-8}$	90	MIYAZAKI	06A	BELL $281 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 9.5 \times 10^{-7}$	90	CHEN	02C	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.0 \times 10^{-3}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

 $\Gamma(e^- \eta)/\Gamma_{\text{total}}$ Γ_{181}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 9.2 \times 10^{-8}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 1.6 \times 10^{-7}$	90	AUBERT	07I	BABR $339 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.4 \times 10^{-7}$	90	ENARI	05	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 8.2 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 24 \times 10^{-5}$	90	KEH	88	CBAL $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

 $\Gamma(\mu^- \eta)/\Gamma_{\text{total}}$ Γ_{182}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 6.5 \times 10^{-8}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035R60

NODE=S035R60

NODE=S035R60

NODE=S035R59

NODE=S035R59

NODE=S035R59

NODE=S035R62

NODE=S035R62

NODE=S035R62

NODE=S035R61

NODE=S035R61

NODE=S035R61

NODE=S035R77

NODE=S035R77

NODE=S035R77

NODE=S035B14

NODE=S035B14

NODE=S035B14

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.5 \times 10^{-7}$	90	AUBERT	07I	BABR	339 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<1.5 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<3.4 \times 10^{-7}$	90	ENARI	04	BELL	84.3 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<9.6 \times 10^{-6}$	90	BONVICINI	97	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG	$E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

$\Gamma(e^- \rho^0)/\Gamma_{\text{total}}$

Γ_{183}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.8 \times 10^{-8}$	90	MIYAZAKI	11	BELL 854 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 4.6 \times 10^{-8}$	90	AUBERT	09W	BABR 451 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.3 \times 10^{-8}$	90	NISHIO	08	BELL 543 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.5 \times 10^{-7}$	90	YUSA	06	BELL 158 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.2 \times 10^{-6}$	90	¹ BARTELTT	94	CLEO Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 37 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

¹ BARTELTT 94 assume phase space decays.

$\Gamma(\mu^- \rho^0)/\Gamma_{\text{total}}$

Γ_{184}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.2 \times 10^{-8}$	90	MIYAZAKI	11	BELL 854 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.6 \times 10^{-8}$	90	AUBERT	09W	BABR 451 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.8 \times 10^{-8}$	90	NISHIO	08	BELL 543 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.3 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 5.7 \times 10^{-6}$	90	¹ BARTELTT	94	CLEO Repl. by BLISS 98
$< 2.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 44 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

¹ BARTELTT 94 assume phase space decays.

$\Gamma(e^- \omega)/\Gamma_{\text{total}}$

Γ_{185}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 4.8 \times 10^{-8}$	90	MIYAZAKI	11	BELL 854 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.1 \times 10^{-7}$	90	AUBERT	08K	BABR 384 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.8 \times 10^{-7}$	90	NISHIO	08	BELL 543 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(\mu^- \omega)/\Gamma_{\text{total}}$

Γ_{186}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 4.7 \times 10^{-8}$	90	MIYAZAKI	11	BELL 854 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.0 \times 10^{-7}$	90	AUBERT	08K	BABR 384 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 8.9 \times 10^{-8}$	90	NISHIO	08	BELL 543 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$\Gamma(e^- K^*(892)^0)/\Gamma_{\text{total}}$

Γ_{187}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 3.2 \times 10^{-8}$	90	MIYAZAKI	11	BELL 854 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 5.9 \times 10^{-8}$	90	AUBERT	09W	BABR 451 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 7.8 \times 10^{-8}$	90	NISHIO	08	BELL 543 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb^{-1} , $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 5.1 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 6.3 \times 10^{-6}$	90	¹ BARTELTT	94	CLEO Repl. by BLISS 98
$< 3.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

¹ BARTELTT 94 assume phase space decays.

NODE=S035R73;LINKAGE=B9

NODE=S035R64
NODE=S035R64
NODE=S035R64

NODE=S035R64;LINKAGE=B9

NODE=S035R63
NODE=S035R63
NODE=S035R63

NODE=S035R63;LINKAGE=B9

NODE=S035C04
NODE=S035C04

NODE=S035C05
NODE=S035C05

NODE=S035R73
NODE=S035R73
NODE=S035R73

$\Gamma(\mu^- K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{188}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<5.9 \times 10^{-8}$	90	NISHIO	08	BELL $543 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<7.2 \times 10^{-8}$	90	MIYAZAKI	11	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<1.7 \times 10^{-7}$	90	AUBERT	09W	BABR $451 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<3.9 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<9.4 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$<4.5 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

¹ BARTEL 94 assume phase space decays. $\Gamma(e^- \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{189}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-8}$	90	MIYAZAKI	11	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<4.6 \times 10^{-8}$	90	AUBERT	09W	BABR $451 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.7 \times 10^{-8}$	90	NISHIO	08	BELL $543 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<4.0 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.4 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<1.1 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98

¹ BARTEL 94 assume phase space decays. $\Gamma(\mu^- \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{190}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<7.0 \times 10^{-8}$	90	MIYAZAKI	11	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<7.3 \times 10^{-8}$	90	AUBERT	09W	BABR $451 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<1.0 \times 10^{-7}$	90	NISHIO	08	BELL $543 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<4.0 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<8.7 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98

¹ BARTEL 94 assume phase space decays. $\Gamma(e^- \eta'(958))/\Gamma_{\text{total}}$ Γ_{191}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.6 \times 10^{-7}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 2.4 \times 10^{-7}$	90	AUBERT	07I	BABR $339 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<10. \times 10^{-7}$	90	ENARI	05	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\mu^- \eta'(958))/\Gamma_{\text{total}}$ Γ_{192}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.3 \times 10^{-7}$	90	MIYAZAKI	07	BELL $401 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.4 \times 10^{-7}$	90	AUBERT	07I	BABR $339 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<4.7 \times 10^{-7}$	90	ENARI	05	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(e^- f_0(980) \rightarrow e^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{193}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.2 \times 10^{-8}$	90	MIYAZAKI	09	BELL $671 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\mu^- f_0(980) \rightarrow \mu^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{194}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-8}$	90	MIYAZAKI	09	BELL $671 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035R74

NODE=S035R74

NODE=S035R74

NODE=S035R74;LINKAGE=B9

NODE=S035B47

NODE=S035B47

NODE=S035B47

NODE=S035B47;LINKAGE=B9

NODE=S035B48

NODE=S035B48

NODE=S035B48

NODE=S035C58

NODE=S035C58

NODE=S035C59

NODE=S035C59

NODE=S035C70

NODE=S035C70

NODE=S035C71

NODE=S035C71

$\Gamma(e^- \phi)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.1 \times 10^{-8}$	90	MIYAZAKI	11	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<3.1 \times 10^{-8}$	90	AUBERT	09W	BABR $451 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$<7.3 \times 10^{-8}$	90	NISHIO	08	BELL $543 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.3 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<6.9 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{195}/Γ

NODE=S035C16

NODE=S035C16

NODE=S035C16

 $\Gamma(\mu^- \phi)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<8.4 \times 10^{-8}$	90	MIYAZAKI	11	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$<1.9 \times 10^{-7}$	90	AUBERT	09W	BABR $451 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<1.3 \times 10^{-7}$	90	NISHIO	08	BELL $543 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.7 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$<7.0 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 Γ_{196}/Γ

NODE=S035C17

NODE=S035C17

NODE=S035C17

 $\Gamma(e^- e^+ e^-)/\Gamma_{\text{total}}$ Γ_{197}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.7 \times 10^{-8}$	90	HAYASAKA	10	BELL $782 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 2.9 \times 10^{-8}$	90	LEES	10A	BABR $468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.6 \times 10^{-8}$	90	MIYAZAKI	08	BELL $535 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.3 \times 10^{-8}$	90	AUBERT	07BK	BABR $376 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-7}$	90	AUBERT	04J	BABR $91.5 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.5 \times 10^{-7}$	90	YUSA	04	BELL $87.1 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.9 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 0.33 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$< 1.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$
$< 40 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

¹ BARTEL 94 assume phase space decays.

NODE=S035R58

NODE=S035R58

NODE=S035R58

 $\Gamma(e^- \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{198}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.7 \times 10^{-8}$	90	HAYASAKA	10	BELL $782 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 3.2 \times 10^{-8}$	90	LEES	10A	BABR $468 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 4.1 \times 10^{-8}$	90	MIYAZAKI	08	BELL $535 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.7 \times 10^{-8}$	90	AUBERT	07BK	BABR $376 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.3 \times 10^{-7}$	90	AUBERT	04J	BABR $91.5 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-7}$	90	YUSA	04	BELL $87.1 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.8 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 0.36 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$
$< 33 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8\text{--}6.8 \text{ GeV}$

¹ BARTEL 94 assume phase space decays.

NODE=S035R58;LINKAGE=B9

NODE=S035R56

NODE=S035R56

NODE=S035R56

 $\Gamma(e^+ \mu^- \mu^-)/\Gamma_{\text{total}}$ Γ_{199}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 1.7 \times 10^{-8}$	90	HAYASAKA	10	BELL $782 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

NODE=S035R56;LINKAGE=B9

NODE=S035R75

NODE=S035R75

NODE=S035R75

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.6 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1}	$E_{\text{cm}} = 10.6 \text{ GeV}$
$<2.3 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1}	$E_{\text{cm}} = 10.6 \text{ GeV}$
$<5.6 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1}	$E_{\text{cm}} = 10.6 \text{ GeV}$
$<1.3 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1}	$E_{\text{cm}} = 10.6 \text{ GeV}$
$<2.0 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1}	$E_{\text{cm}} = 10.6 \text{ GeV}$
$<1.5 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<0.35 \times 10^{-5}$	90	¹ BARTEL	94	CLEO	Repl. by BLISS 98	
$<1.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG	$E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<1.6 \times 10^{-5}$	90	BOWCOCK	90	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.4-10.9$	

¹ BARTEL 94 assume phase space decays.

$\Gamma(\mu^- e^+ e^-)/\Gamma_{\text{total}}$

Γ_{200}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.8 \times 10^{-8}$	90	HAYASAKA	10	BELL 782 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 2.2 \times 10^{-8}$	90	LEES	10A	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.7 \times 10^{-8}$	90	MIYAZAKI	08	BELL 535 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 8.0 \times 10^{-8}$	90	AUBERT	07BK	BABR 376 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.7 \times 10^{-7}$	90	AUBERT	04J	BABR 91.5 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-7}$	90	YUSA	04	BELL 87.1 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.7 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 0.34 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$< 1.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4-10.9$
$< 44 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8-6.8 \text{ GeV}$

¹ BARTEL 94 assume phase space decays.

$\Gamma(\mu^+ e^- e^-)/\Gamma_{\text{total}}$

Γ_{201}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.5 \times 10^{-8}$	90	HAYASAKA	10	BELL 782 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 1.8 \times 10^{-8}$	90	LEES	10A	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-8}$	90	MIYAZAKI	08	BELL 535 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 5.8 \times 10^{-8}$	90	AUBERT	07BK	BABR 376 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.1 \times 10^{-7}$	90	AUBERT	04J	BABR 91.5 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-7}$	90	YUSA	04	BELL 87.1 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 0.34 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$< 1.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 1.6 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4-10.9$

¹ BARTEL 94 assume phase space decays.

$\Gamma(\mu^- \mu^+ \mu^-)/\Gamma_{\text{total}}$

Γ_{202}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.1 \times 10^{-8}$	90	HAYASAKA	10	BELL 782 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 3.3 \times 10^{-8}$	90	LEES	10A	BABR 468 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 3.2 \times 10^{-8}$	90	MIYAZAKI	08	BELL 535 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 5.3 \times 10^{-8}$	90	AUBERT	07BK	BABR 376 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-7}$	90	AUBERT	04J	BABR 91.5 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 2.0 \times 10^{-7}$	90	YUSA	04	BELL 87.1 fb^{-1} $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$< 0.43 \times 10^{-5}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$
$< 1.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4-10.9$
$< 49 \times 10^{-5}$	90	HAYES	82	MRK2 $E_{\text{cm}}^{\text{ee}} = 3.8-6.8 \text{ GeV}$

¹ BARTEL 94 assume phase space decays.

NODE=S035R75;LINKAGE=B9

NODE=S035R57

NODE=S035R57

NODE=S035R57

NODE=S035R57;LINKAGE=B9

NODE=S035R76

NODE=S035R76

NODE=S035R76

NODE=S035R76;LINKAGE=B9

NODE=S035R55

NODE=S035R55

NODE=S035R55

NODE=S035R55;LINKAGE=B9

$\Gamma(e^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{203}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<2.3 \times 10^{-8}$ (CL = 90%)				$[<4.4 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<2.3 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<4.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<7.3 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<2.2 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<4.4 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<2.7 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<6.0 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays.

NODE=S035R65

NODE=S035R65

NODE=S035R65

 $\Gamma(e^+ \pi^- \pi^-)/\Gamma_{\text{total}}$ Γ_{204}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<2.0 \times 10^{-8}$ (CL = 90%)				$[<8.8 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<2.0 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<8.8 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<2.0 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<2.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.9 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<4.4 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<1.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<1.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays.

NODE=S035R65;LINKAGE=B9

 $\Gamma(\mu^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{205}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<2.1 \times 10^{-8}$ (CL = 90%)				$[<3.3 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<2.1 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<3.3 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<4.8 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<2.9 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<8.2 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<7.4 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<3.6 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<3.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays.

NODE=S035R66;LINKAGE=B9

 $\Gamma(\mu^+ \pi^- \pi^-)/\Gamma_{\text{total}}$ Γ_{206}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.9 \times 10^{-8}$ (CL = 90%)				$[<3.7 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.9 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<3.7 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<3.4 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<7 \times 10^{-8}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<3.4 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<6.9 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<6.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<3.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays.

NODE=S035R68

NODE=S035R68

NODE=S035R68

NODE=S035R68;LINKAGE=B9

$\Gamma(e^- \pi^+ K^-)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.7 \times 10^{-8}$ (CL = 90%)				[$<5.8 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.7 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<5.8 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<7.2 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<3.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<6.4 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<7.7 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<2.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<5.8 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays. Γ_{207}/Γ

NODE=S035R69

NODE=S035R69

NODE=S035R69

 $\Gamma(e^- \pi^- K^+)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.1 \times 10^{-8}$ (CL = 90%)				[$<5.2 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.1 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<5.2 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<1.6 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<3.8 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<4.6 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<5.8 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays. Γ_{208}/Γ

NODE=S035R86

NODE=S035R86

NODE=S035R86

 $\Gamma(e^+ \pi^- K^-)/\Gamma_{\text{total}}$

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.2 \times 10^{-8}$ (CL = 90%)				[$<6.7 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.2 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<6.7 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<1.9 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.8 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<2.1 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<4.5 \times 10^{-6}$	90	¹ BARTEL	94	CLEO Repl. by BLISS 98	
$<2.0 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$<4.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTEL 94 assume phase space decays. Γ_{209}/Γ

NODE=S035R70

NODE=S035R70

NODE=S035R70

 $\Gamma(e^- K_S^0 K_S^0)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<7.1 \times 10^{-8}$	90	MIYAZAKI	10A	BELL $671 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<2.2 \times 10^{-6}$	90	CHEN	02C	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

NODE=S035R70;LINKAGE=B9

 Γ_{210}/Γ

NODE=S035C55

NODE=S035C55

NODE=S035C55

 $\Gamma(e^- K^+ K^-)/\Gamma_{\text{total}}$

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.4 \times 10^{-8}$ (CL = 90%)				[$<5.4 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.4 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<5.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<3.0 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.4 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<6.0 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

NODE=S035C12

NODE=S035C12

NODE=S035C12

$\Gamma(e^+ K^- K^-)/\Gamma_{\text{total}}$ Γ_{212}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$<3.3 \times 10^{-8}$ (CL = 90%)				[$<6.0 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$<3.3 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$<6.0 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$<3.1 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<1.5 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$<3.8 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\mu^- \pi^+ K^-)/\Gamma_{\text{total}}$ Γ_{213}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 8.6 \times 10^{-8}$ (CL = 90%)				[$<1.6 \times 10^{-7}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$< 8.6 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 1.6 \times 10^{-7}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$< 2.7 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 2.6 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 7.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 8.7 \times 10^{-6}$	90	¹ BARTELT	94	CLEO Repl. by BLISS 98	
$< 11 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$< 7.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTELT 94 assume phase space decays. $\Gamma(\mu^- \pi^- K^+)/\Gamma_{\text{total}}$ Γ_{214}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 4.5 \times 10^{-8}$ (CL = 90%)				[$<1.0 \times 10^{-7}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$< 4.5 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 1.0 \times 10^{-7}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$< 7.3 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 3.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 7.4 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 1.5 \times 10^{-5}$	90	¹ BARTELT	94	CLEO Repl. by BLISS 98	
$< 7.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTELT 94 assume phase space decays. $\Gamma(\mu^+ \pi^- K^-)/\Gamma_{\text{total}}$ Γ_{215}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 4.8 \times 10^{-8}$ (CL = 90%)				[$<9.4 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$< 4.8 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 9.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$< 2.9 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 2.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 7.0 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 2.0 \times 10^{-5}$	90	¹ BARTELT	94	CLEO Repl. by BLISS 98	
$< 5.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	
$< 4.0 \times 10^{-5}$	90	BOWCOCK	90	CLEO $E_{\text{cm}}^{\text{ee}} = 10.4\text{--}10.9$	

¹ BARTELT 94 assume phase space decays. $\Gamma(\mu^- K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{216}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 8.0 \times 10^{-8}$	90	MIYAZAKI	10A	BELL $671 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 3.4 \times 10^{-6}$	90	CHEN	02C	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

NODE=S035C13

NODE=S035C13

NODE=S035C13

NODE=S035R71

NODE=S035R71

NODE=S035R71

NODE=S035R87

NODE=S035R87

NODE=S035R87

NODE=S035R72

NODE=S035R72

NODE=S035R72

NODE=S035R72;LINKAGE=B9

NODE=S035C56

NODE=S035C56

$\Gamma(\mu^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_{217}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 4.4 \times 10^{-8}$ (CL = 90%)				[$< 6.8 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$< 4.4 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 6.8 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$< 8.0 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 2.5 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 15 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\mu^+ K^- K^-)/\Gamma_{\text{total}}$ Γ_{218}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 4.7 \times 10^{-8}$ (CL = 90%)				[$< 9.6 \times 10^{-8}$ (CL = 90%) OUR 2012 BEST LIMIT]	
$< 4.7 \times 10^{-8}$	90	MIYAZAKI	13	BELL $854 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 9.6 \times 10^{-8}$	90	MIYAZAKI	10	BELL Repl. by MIYAZAKI 13	
$< 4.4 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 4.8 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$< 6.0 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(e^- \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{219}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 6.5 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\mu^- \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{220}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 14 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(e^- \eta \eta)/\Gamma_{\text{total}}$ Γ_{221}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 35 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\mu^- \eta \eta)/\Gamma_{\text{total}}$ Γ_{222}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 60 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(e^- \pi^0 \eta)/\Gamma_{\text{total}}$ Γ_{223}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 24 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\mu^- \pi^0 \eta)/\Gamma_{\text{total}}$ Γ_{224}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 22 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	

 $\Gamma(\bar{p}\gamma)/\Gamma_{\text{total}}$ Γ_{225}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 3.5 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$					
$< 29 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$	

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$\Gamma(\bar{p}\pi^0)/\Gamma_{\text{total}}$ Γ_{226}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 15 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 66 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

 $\Gamma(\bar{p}2\pi^0)/\Gamma_{\text{total}}$ Γ_{227}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 33 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{228}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 8.9 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$< 130 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{\text{ee}} = 10 \text{ GeV}$

 $\Gamma(\bar{p}\pi^0\eta)/\Gamma_{\text{total}}$ Γ_{229}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 27 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\Lambda\pi^-)/\Gamma_{\text{total}}$ Γ_{230}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 0.72 \times 10^{-7}$	90	MIYAZAKI	06	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(\bar{\Lambda}\pi^-)/\Gamma_{\text{total}}$ Γ_{231}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.4 \times 10^{-7}$	90	MIYAZAKI	06	BELL $154 \text{ fb}^{-1}, E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

 $\Gamma(e^- \text{ light boson})/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ Γ_{232}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.015	95	1 ALBRECHT	95G	ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

 $\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$ < 0.018 95 2 ALBRECHT 90E ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$ < 0.040 95 3 BALTRUSAIT..85 MRK3 $E_{\text{cm}}^{\text{ee}} = 3.77 \text{ GeV}$ 1 ALBRECHT 95G limit holds for bosons with mass $< 0.4 \text{ GeV}$. The limit rises to 0.036 for a mass of 1.0 GeV, then falls to 0.006 at the upper mass limit of 1.6 GeV.2 ALBRECHT 90E limit applies for spinless boson with mass $< 100 \text{ MeV}$, and rises to 0.050 for mass = 500 MeV.3 BALTRUSAITIS 85 limit applies for spinless boson with mass $< 100 \text{ MeV}$. $\Gamma(\mu^- \text{ light boson})/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ Γ_{233}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.026	95	1 ALBRECHT	95G	ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

 $\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$ < 0.033 95 2 ALBRECHT 90E ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$ < 0.125 95 3 BALTRUSAIT..85 MRK3 $E_{\text{cm}}^{\text{ee}} = 3.77 \text{ GeV}$ 1 ALBRECHT 95G limit holds for bosons with mass $< 1.3 \text{ GeV}$. The limit rises to 0.034 for a mass of 1.4 GeV, then falls to 0.003 at the upper mass limit of 1.6 GeV.2 ALBRECHT 90E limit applies for spinless boson with mass $< 100 \text{ MeV}$, and rises to 0.071 for mass = 500 MeV.3 BALTRUSAITIS 85 limit applies for spinless boson with mass $< 100 \text{ MeV}$.

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NODE=S035B12;LINKAGE=C

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NODE=S035B12;LINKAGE=A

τ -DECAY PARAMETERS

A REVIEW GOES HERE – Check our WWW List of Reviews

 $\rho(e \text{ or } \mu)$ PARAMETER(V-A) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.745±0.008 OUR FIT				
0.749±0.008 OUR AVERAGE				
0.742±0.014±0.006	81k	HEISTER 01E	ALEP	1991–1995 LEP runs
0.775±0.023±0.020	36k	ABREU 00L	DLPH	1992–1995 runs
0.781±0.028±0.018	46k	ACKERSTAFF 99D	OPAL	1990–1995 LEP runs
0.762±0.035	54k	ACCIARRI 98R	L3	1991–1995 LEP runs
0.731±0.031		¹ ALBRECHT 98	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.72 ± 0.09 ± 0.03		² ABE 970	SLD	1993–1995 SLC runs
0.747±0.010±0.006	55k	ALEXANDER 97F	CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$
0.79 ± 0.10 ± 0.10	3732	FORD 87B	MAC	$E_{cm}^{ee} = 29 \text{ GeV}$
0.71 ± 0.09 ± 0.03	1426	BEHRENDS 85	CLEO	$e^+ e^-$ near $\gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.735±0.013±0.008	31k	AMMAR 97B	CLEO	Repl. by ALEXANDER 97F
0.794±0.039±0.031	18k	ACCIARRI 96H	L3	Repl. by ACCIARRI 98R
0.732±0.034±0.020	8.2k	³ ALBRECHT 95	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.738±0.038		⁴ ALBRECHT 95C	ARG	Repl. by ALBRECHT 98
0.751±0.039±0.022		BUSKULIC 95D	ALEP	Repl. by HEISTER 01E
0.742±0.035±0.020	8000	ALBRECHT 90E	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$

¹ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

² ABE 970 assume $\eta = 0$ in their fit. Letting η vary in the fit gives a ρ value of $0.69 \pm 0.13 \pm 0.05$.

³ Value is from a simultaneous fit for the ρ and η decay parameters to the lepton energy spectrum. Not independent of ALBRECHT 90E $\rho(e \text{ or } \mu)$ value which assumes $\eta = 0$. Result is strongly correlated with ALBRECHT 95C.

⁴ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.

 $\rho(e)$ PARAMETER(V-A) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.747±0.010 OUR FIT				
0.744±0.010 OUR AVERAGE				
0.747±0.019±0.014	44k	HEISTER 01E	ALEP	1991–1995 LEP runs
0.744±0.036±0.037	17k	ABREU 00L	DLPH	1992–1995 runs
0.779±0.047±0.029	25k	ACKERSTAFF 99D	OPAL	1990–1995 LEP runs
0.68 ± 0.04 ± 0.07		¹ ALBRECHT 98	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.71 ± 0.14 ± 0.05		ABE 970	SLD	1993–1995 SLC runs
0.747±0.012±0.004	34k	ALEXANDER 97F	CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$
0.735±0.036±0.020	4.7k	² ALBRECHT 95	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.79 ± 0.08 ± 0.06	3230	³ ALBRECHT 93G	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
0.64 ± 0.06 ± 0.07	2753	JANSSEN 89	CBAL	$E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
0.62 ± 0.17 ± 0.14	1823	FORD 87B	MAC	$E_{cm}^{ee} = 29 \text{ GeV}$
0.60 ± 0.13	699	BEHRENDS 85	CLEO	$e^+ e^-$ near $\gamma(4S)$
0.72 ± 0.10 ± 0.11	594	BACINO 79B	DLCO	$E_{cm}^{ee} = 3.5\text{--}7.4 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.732±0.014±0.009	19k	AMMAR 97B	CLEO	Repl. by ALEXANDER 97F
0.793±0.050±0.025		BUSKULIC 95D	ALEP	Repl. by HEISTER 01E
0.747±0.045±0.028	5106	ALBRECHT 90E	ARG	Repl. by ALBRECHT 95

¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

² ALBRECHT 95 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- (\pi^0 \bar{\nu}_\tau))$ and their charged conjugates.

³ ALBRECHT 93G use tau pair events of the type $\tau^- \tau^+ \rightarrow (\mu^- \bar{\nu}_\mu \nu_\tau)(e^+ \nu_e \bar{\nu}_\tau)$ and their charged conjugates.

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NODE=S035RHO;LINKAGE=C

NODE=S035RHE

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NODE=S035RHE;LINKAGE=RC

NODE=S035RHE;LINKAGE=A

NODE=S035RHE;LINKAGE=B

$\rho(\mu)$ PARAMETER

($V-A$) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.763±0.020 OUR FIT				
0.770±0.022 OUR AVERAGE				
0.776±0.045±0.019	46k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.999±0.098±0.045	22k	ABREU	00L	DLPH 1992–1995 runs
0.777±0.044±0.016	27k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
0.69 ± 0.06 ± 0.06		¹ ALBRECHT	98	ARG $E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.54 ± 0.28 ± 0.14		ABE	970	SLD 1993–1995 SLC runs
0.750±0.017±0.045	22k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
0.76 ± 0.07 ± 0.08	3230	ALBRECHT	93G	ARG $E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
0.734±0.055±0.027	3041	ALBRECHT	90E	ARG $E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
0.89 ± 0.14 ± 0.08	1909	FORD	87B	MAC $E_{cm}^{ee} = 29 \text{ GeV}$
0.81 ± 0.13	727	BEHRENDS	85	CLEO $e^+ e^-$ near $\gamma(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.747±0.048±0.044	13k	AMMAR	97B	CLEO Repl. by ALEXANDER 97F
0.693±0.057±0.028		BUSKULIC	95D	ALEP Repl. by HEISTER 01E

¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

NODE=S035RHM

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$\xi(e \text{ or } \mu)$ PARAMETER

($V-A$) theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.985±0.030 OUR FIT				
0.981±0.031 OUR AVERAGE				
0.986±0.068±0.031	81k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.929±0.070±0.030	36k	ABREU	00L	DLPH 1992–1995 runs
0.98 ± 0.22 ± 0.10	46k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
0.70 ± 0.16	54k	ACCIARRI	98R	L3 1991–1995 LEP runs
1.03 ± 0.11		¹ ALBRECHT	98	ARG $E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
1.05 ± 0.35 ± 0.04		² ABE	970	SLD 1993–1995 SLC runs
1.007±0.040±0.015	55k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.94 ± 0.21 ± 0.07	18k	ACCIARRI	96H	L3 Repl. by ACCIARRI 98R
0.97 ± 0.14		³ ALBRECHT	95C	ARG Repl. by ALBRECHT 98
1.18 ± 0.15 ± 0.16		BUSKULIC	95D	ALEP Repl. by HEISTER 01E
0.90 ± 0.15 ± 0.10	3230	⁴ ALBRECHT	93G	ARG $E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$

¹ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

² ABE 970 assume $\eta = 0$ in their fit. Letting η vary in the fit gives a ξ value of $1.02 \pm 0.36 \pm 0.05$.

³ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- h^+ \bar{\nu}_\tau)$ and their charged conjugates.

⁴ ALBRECHT 93G measurement determines $|\xi|$ for the case $\xi(e) = \xi(\mu)$, but the authors point out that other LEP experiments determine the sign to be positive.

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NODE=S035XI;LINKAGE=RC

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NODE=S035XI;LINKAGE=FF

NODE=S035XI;LINKAGE=A

NODE=S035XE

NODE=S035XE

NODE=S035XE

$\xi(e)$ PARAMETER

($V-A$) theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.994±0.040 OUR FIT				
1.00 ± 0.04 OUR AVERAGE				
1.011±0.094±0.038	44k	HEISTER	01E	ALEP 1991–1995 LEP runs
1.01 ± 0.12 ± 0.05	17k	ABREU	00L	DLPH 1992–1995 runs
1.13 ± 0.39 ± 0.14	25k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
1.11 ± 0.20 ± 0.08		¹ ALBRECHT	98	ARG $E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
1.16 ± 0.52 ± 0.06		ABE	970	SLD 1993–1995 SLC runs
0.979±0.048±0.016	34k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.03 ± 0.23 ± 0.09		BUSKULIC	95D	ALEP Repl. by HEISTER 01E

¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

NODE=S035XE;LINKAGE=RC

$\xi(\mu)$ PARAMETER

($V-A$) theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.030±0.059 OUR FIT				
1.06 ± 0.06 OUR AVERAGE				
1.030 ± 0.120 ± 0.050	46k	HEISTER	01E ALEP	1991–1995 LEP runs
1.16 ± 0.19 ± 0.06	22k	ABREU	00L DLPH	1992–1995 runs
0.79 ± 0.41 ± 0.09	27k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
1.26 ± 0.27 ± 0.14		¹ ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.75 ± 0.50 ± 0.14		ABE	970 SLD	1993–1995 SLC runs
1.054 ± 0.069 ± 0.047	22k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.23 ± 0.22 ± 0.10	BUSKULIC	95D ALEP	Repl. by HEISTER 01E
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¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

NODE=S035XM

NODE=S035XM

NODE=S035XM

$\eta(e \text{ or } \mu)$ PARAMETER

($V-A$) theory predicts $\eta = 0$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.013±0.020 OUR FIT				
0.015±0.021 OUR AVERAGE				
0.012 ± 0.026 ± 0.004	81k	HEISTER	01E ALEP	1991–1995 LEP runs
-0.005 ± 0.036 ± 0.037		ABREU	00L DLPH	1992–1995 runs
0.027 ± 0.055 ± 0.005	46k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.27 ± 0.14	54k	ACCIARRI	98R L3	1991–1995 LEP runs
-0.13 ± 0.47 ± 0.15		ABE	970 SLD	1993–1995 SLC runs
-0.015 ± 0.061 ± 0.062	31k	AMMAR	97B CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$
0.03 ± 0.18 ± 0.12	8.2k	ALBRECHT	95 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.25 ± 0.17 ± 0.11	18k	ACCIARRI	96H L3	Repl. by ACCIARRI 98R
-0.04 ± 0.15 ± 0.11		BUSKULIC	95D ALEP	Repl. by HEISTER 01E

NODE=S035XM;LINKAGE=RC

NODE=S035ETA

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NODE=S035ETA

$\eta(\mu)$ PARAMETER

($V-A$) theory predicts $\eta = 0$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.094±0.073 OUR FIT				
0.17 ± 0.15 OUR AVERAGE				
0.160 ± 0.150 ± 0.060	46k	HEISTER	01E ALEP	1991–1995 LEP runs
0.72 ± 0.32 ± 0.15		ABREU	00L DLPH	1992–1995 runs
-0.59 ± 0.82 ± 0.45		¹ ABE	970 SLD	1993–1995 SLC runs
0.010 ± 0.149 ± 0.171	13k	² AMMAR	97B CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.010 ± 0.065 ± 0.001	27k	³ ACKERSTAFF	99D OPAL	1990–1995 LEP runs
-0.24 ± 0.23 ± 0.18		BUSKULIC	95D ALEP	Repl. by HEISTER 01E

NODE=S035ETM

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1 Highly correlated (corr. = 0.92) with ABE 970 $\rho(\mu)$ measurement.

2 Highly correlated (corr. = 0.949) with AMMAR 97B $\rho(\mu)$ value.

3 ACKERSTAFF 99D result is dominated by a constraint on η from the OPAL measurements of the τ lifetime and $B(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau)$ assuming lepton universality for the total coupling strength.

NODE=S035ETM;LINKAGE=B

NODE=S035ETM;LINKAGE=A

NODE=S035ETM;LINKAGE=K9

$(\delta\xi)(e \text{ or } \mu)$ PARAMETER

($V-A$) theory predicts $(\delta\xi) = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.746±0.021 OUR FIT				
0.744 ± 0.022 OUR AVERAGE				
0.776 ± 0.045 ± 0.024	81k	HEISTER	01E ALEP	1991–1995 LEP runs
0.779 ± 0.070 ± 0.028	36k	ABREU	00L DLPH	1992–1995 runs
0.65 ± 0.14 ± 0.07	46k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.70 ± 0.11	54k	ACCIARRI	98R L3	1991–1995 LEP runs
0.63 ± 0.09		¹ ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.88 ± 0.27 ± 0.04		² ABE	970 SLD	1993–1995 SLC runs
0.745 ± 0.026 ± 0.009	55k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.81 ± 0.14 ± 0.06	18k	ACCIARRI	96H L3	Repl. by ACCIARRI 98R
0.65 ± 0.12		³ ALBRECHT	95C ARG	Repl. by ALBRECHT 98
0.88 ± 0.11 ± 0.07		BUSKULIC	95D ALEP	Repl. by HEISTER 01E

NODE=S035DXI

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OCCUR=2

¹ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

² ABE 970 assume $\eta = 0$ in their fit. Letting η vary in the fit gives a $(\delta\xi)$ value of $0.87 \pm 0.27 \pm 0.04$.

³ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- \bar{\nu}_\tau)$ and their charged conjugates.

($\delta\xi$)(e) PARAMETER

(V-A) theory predicts $(\delta\xi) = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.734±0.028 OUR FIT

0.731±0.029 OUR AVERAGE

0.778±0.066±0.024	44k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.85 ± 0.12 ± 0.04	17k	ABREU	00L	DLPH 1992–1995 runs
0.72 ± 0.31 ± 0.14	25k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
0.56 ± 0.14 ± 0.06		¹ ALBRECHT	98	ARG $E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.85 ± 0.43 ± 0.08		ABE	970	SLD 1993–1995 SLC runs
0.720±0.032±0.010	34k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.11 ± 0.17 ± 0.07 BUSKULIC 95D ALEP Repl. by HEISTER 01E

¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

($\delta\xi$)(μ) PARAMETER

(V-A) theory predicts $(\delta\xi) = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.778±0.037 OUR FIT

0.79 ± 0.04 OUR AVERAGE

0.786±0.066±0.028	46k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.86 ± 0.13 ± 0.04	22k	ABREU	00L	DLPH 1992–1995 runs
0.63 ± 0.23 ± 0.05	27k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
0.73 ± 0.18 ± 0.10		¹ ALBRECHT	98	ARG $E_{cm}^{ee} = 9.5\text{--}10.6 \text{ GeV}$
0.82 ± 0.32 ± 0.07		ABE	970	SLD 1993–1995 SLC runs
0.786±0.041±0.032	22k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.71 ± 0.14 ± 0.06 BUSKULIC 95D ALEP Repl. by HEISTER 01E

¹ ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

$\xi(\pi)$ PARAMETER

(V-A) theory predicts $\xi(\pi) = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.993±0.022 OUR FIT

0.994±0.023 OUR AVERAGE

0.994±0.020±0.014	27k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.81 ± 0.17 ± 0.02		ABE	970	SLD 1993–1995 SLC runs
1.03 ± 0.06 ± 0.04	2.0k	COAN	97	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.987±0.057±0.027		BUSKULIC	95D	ALEP Repl. by HEISTER 01E
0.95 ± 0.11 ± 0.05		¹ BUSKULIC	94D	ALEP 1990+1991 LEP run

1 Superseded by BUSKULIC 95D.

$\xi(\rho)$ PARAMETER

(V-A) theory predicts $\xi(\rho) = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.994±0.008 OUR FIT

0.994±0.009 OUR AVERAGE

0.987±0.012±0.011	59k	HEISTER	01E	ALEP 1991–1995 LEP runs
0.99 ± 0.12 ± 0.04		ABE	970	SLD 1993–1995 SLC runs
0.995±0.010±0.003	66k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6 \text{ GeV}$
1.022±0.028±0.030	1.7k	¹ ALBRECHT	94E	ARG $E_{cm}^{ee} = 9.4\text{--}10.6 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.045±0.058±0.032		BUSKULIC	95D	ALEP Repl. by HEISTER 01E
1.03 ± 0.11 ± 0.05		² BUSKULIC	94D	ALEP 1990+1991 LEP run

¹ ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90i to obtain the quoted result.

² Superseded by BUSKULIC 95D.

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NODE=S035XPI;LINKAGE=XH

NODE=S035XRH

NODE=S035XRH

NODE=S035XRH

NODE=S035XRH;LINKAGE=AK

NODE=S035XRH;LINKAGE=XH

$\xi(a_1)$ PARAMETER

(V-A) theory predicts $\xi(a_1) = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.001±0.027 OUR FIT				
1.002±0.028 OUR AVERAGE				
1.000±0.016±0.024	35k	1 HEISTER 01E	ALEP	1991–1995 LEP runs
1.02 ± 0.13 ± 0.03	17.2k	ASNER 00	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.29 ± 0.26 ± 0.11	7.4k	2 ACKERSTAFF 97R	OPAL	1992–1994 LEP runs
0.85 ± 0.15 ± 0.05		ALBRECHT 95C	ARG	$E_{cm}^{ee} = 9.5$ –10.6 GeV
1.25 ± 0.23 ± 0.15	7.5k	ALBRECHT 93C	ARG	$E_{cm}^{ee} = 9.4$ –10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.08 ± 0.46 ± 0.14	2.6k	3 AKERS 95P	OPAL	Repl. by ACKERSTAFF 97R
0.937±0.116±0.064		BUSKULIC 95D	ALEP	Repl. by HEISTER 01E

¹ HEISTER 01E quote $1.000 \pm 0.016 \pm 0.013 \pm 0.020$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty.

² ACKERSTAFF 97R obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.16 \pm 0.04$, and with the model of Isgur *et al.* (PR **D39**, 1357 (1989)) they obtain $1.20 \pm 0.21 \pm 0.14$.

³ AKERS 95P obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.27^{+0.05}_{-0.06}$, and with the model of Isgur *et al.* (PR **D39**, 1357 (1989)) they obtain $1.10 \pm 0.31^{+0.13}_{-0.14}$.

$\xi(\text{all hadronic modes})$ PARAMETER

(V-A) theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.995±0.007 OUR FIT				
0.997±0.007 OUR AVERAGE				
0.992±0.007±0.008	102k	1 HEISTER 01E	ALEP	1991–1995 LEP runs
0.997±0.027±0.011	39k	2 ABREU 00L	DLPH	1992–1995 runs
1.02 ± 0.13 ± 0.03	17.2k	3 ASNER 00	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.032±0.031	37k	4 ACCIARRI 98R	L3	1991–1995 LEP runs
0.93 ± 0.10 ± 0.04		ABE 970	SLD	1993–1995 SLC runs
1.29 ± 0.26 ± 0.11	7.4k	5 ACKERSTAFF 97R	OPAL	1992–1994 LEP runs
0.995±0.010±0.003	66k	6 ALEXANDER 97F	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.03 ± 0.06 ± 0.04	2.0k	7 COAN 97	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.017±0.039		8 ALBRECHT 95C	ARG	$E_{cm}^{ee} = 9.5$ –10.6 GeV
1.25 ± 0.23 ± 0.15	7.5k	9 ALBRECHT 93C	ARG	$E_{cm}^{ee} = 9.4$ –10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.970±0.053±0.011	14k	10 ACCIARRI 96H	L3	Repl. by ACCIARRI 98R
1.08 ± 0.46 ± 0.14	2.6k	11 AKERS 95P	OPAL	Repl. by ACKERSTAFF 97R
1.006±0.032±0.019		12 BUSKULIC 95D	ALEP	Repl. by HEISTER 01E
1.022±0.028±0.030	1.7k	13 ALBRECHT 94E	ARG	$E_{cm}^{ee} = 9.4$ –10.6 GeV
0.99 ± 0.07 ± 0.04		14 BUSKULIC 94D	ALEP	1990+1991 LEP run

¹ HEISTER 01E quote $0.992 \pm 0.007 \pm 0.006 \pm 0.005$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty. They use $\tau \rightarrow \pi\nu_\tau$, $\tau \rightarrow K\nu_\tau$, $\tau \rightarrow \rho\nu_\tau$, and $\tau \rightarrow a_1\nu_\tau$ decays.

² ABREU 00L use $\tau^- \rightarrow h^- \geq 0\pi^0\nu_\tau$ decays.

³ ASNER 00 use $\tau^- \rightarrow \pi^- 2\pi^0\nu_\tau$ decays.

⁴ ACCIARRI 98R use $\tau \rightarrow \pi\nu_\tau$, $\tau \rightarrow K\nu_\tau$, and $\tau \rightarrow \rho\nu_\tau$ decays.

⁵ ACKERSTAFF 97R use $\tau \rightarrow a_1\nu_\tau$ decays.

⁶ ALEXANDER 97F use $\tau \rightarrow \rho\nu_\tau$ decays.

⁷ COAN 97 use $h^+ h^-$ energy correlations.

⁸ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.

⁹ Uses $\tau \rightarrow a_1\nu_\tau$ decays. Replaced by ALBRECHT 95C.

¹⁰ ACCIARRI 96H use $\tau \rightarrow \pi\nu_\tau$, $\tau \rightarrow K\nu_\tau$, and $\tau \rightarrow \rho\nu_\tau$ decays.

¹¹ AKERS 95P use $\tau \rightarrow a_1\nu_\tau$ decays.

¹² BUSKULIC 95D use $\tau \rightarrow \pi\nu_\tau$, $\tau \rightarrow \rho\nu_\tau$, and $\tau \rightarrow a_1\nu_\tau$ decays.

¹³ ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90I to obtain the quoted result. Uses $\tau \rightarrow a_1\nu_\tau$ decays. Replaced by ALBRECHT 95C.

¹⁴ BUSKULIC 94D use $\tau \rightarrow \pi\nu_\tau$ and $\tau \rightarrow \rho\nu_\tau$ decays. Superseded by BUSKULIC 95D.

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NODE=S035XA1

OCCUR=2

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NODE=S035XAL;LINKAGE=A

NODE=S035XAL;LINKAGE=C

τ REFERENCES

				NODE=S035
MIYAZAKI	13	PL B719 346	Y. Miyazaki <i>et al.</i>	REFID=54895
LEES	12M	PR D85 031102	J.P. Lees <i>et al.</i>	REFID=54380
Also		PR D85 099904 (errat)	J.P. Lees <i>et al.</i>	REFID=54381
LEES	12X	PR D86 092010	J.P. Lees <i>et al.</i>	REFID=54714
LEES	12Y	PR D86 092013	J.P. Lees <i>et al.</i>	REFID=54715
PDG	12	PR D86 010001	J. Beringer <i>et al.</i>	REFID=54066
DEL-AMO-SA...	11E	PR D83 032002	P. del Amo Sanchez <i>et al.</i>	REFID=53670
MIYAZAKI	11	PL B699 251	Y. Miyazaki <i>et al.</i>	REFID=16671
AUBERT	10B	PRL 104 021802	B. Aubert <i>et al.</i>	REFID=53203
AUBERT	10F	PRL 105 051602	B. Aubert <i>et al.</i>	REFID=53320
HAYASAKA	10	PL B687 139	K. Hayasaka <i>et al.</i>	REFID=53299
LEE	10	PR D81 113007	M.J. Lee <i>et al.</i>	REFID=53332
LEES	10A	PR D81 111101	J.P. Lees <i>et al.</i>	REFID=53333
MIYAZAKI	10	PL B682 355	Y. Miyazaki <i>et al.</i>	REFID=53162
MIYAZAKI	10A	PL B692 4	Y. Miyazaki <i>et al.</i>	REFID=53335
AUBERT	09AK	PR D80 092005	B. Aubert <i>et al.</i>	REFID=53078
AUBERT	09D	PR D79 012004	B. Aubert <i>et al.</i>	REFID=52644
AUBERT	09W	PRL 103 021801	B. Aubert <i>et al.</i>	REFID=52927
GROZIN	09A	PAN 72 1203	A.G. Grozin, I.B. Khriplovich, A.S. Rudenko (NOVO)	REFID=53013
INAMI	09	PL B672 209	K. Inami <i>et al.</i>	REFID=52653
MIYAZAKI	09	PL B672 317	Y. Miyazaki <i>et al.</i>	REFID=52630
AUBERT	08	PRL 100 011801	B. Aubert <i>et al.</i>	REFID=52104
AUBERT	08AE	PR D77 112002	B. Aubert <i>et al.</i>	REFID=52354
AUBERT	08K	PRL 100 071802	B. Aubert <i>et al.</i>	REFID=52209
FUJIKAWA	08	PR D78 072006	M. Fujikawa <i>et al.</i>	REFID=52536
HAYASAKA	08	PL B666 16	K. Hayasaka <i>et al.</i>	REFID=52463
MIYAZAKI	08	PL B660 154	Y. Miyazaki <i>et al.</i>	REFID=52177
NISHIO	08	PL B664 35	Y. Nishio <i>et al.</i>	REFID=52237
ANASHIN	07	JETPL 85 347	V.V. Anashin <i>et al.</i>	REFID=51655
		Translated from ZETFP 85 429.		
AUBERT	07AP	PR D76 051104	B. Aubert <i>et al.</i>	REFID=51933
AUBERT	07BK	PRL 99 251803	B. Aubert <i>et al.</i>	REFID=52094
AUBERT	07I	PRL 98 061803	B. Aubert <i>et al.</i>	REFID=51668
BELOUS	07	PRL 99 011801	K. Belous <i>et al.</i>	REFID=51866
EIDELMAN	07	MPL A22 159	S. Eidelman, M. Passera (NOVO, PADO)	REFID=51670
EPIFANOV	07	PL B654 65	D. Epifanov <i>et al.</i>	REFID=51929
MIYAZAKI	07	PL B648 341	Y. Miyazaki <i>et al.</i>	REFID=51669
ABDALLAH	06A	EPJ C46 1	J. Abdallah <i>et al.</i>	(DELPHI Collab.) REFID=51078
AUBERT	06C	PRL 96 041801	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=51046
AUBERT,B	06	PR D73 112003	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=51282
INAMI	06	PL B643 5	K. Inami <i>et al.</i>	(BELLE Collab.) REFID=51493
MIYAZAKI	06	PL B632 51	Y. Miyazaki <i>et al.</i>	(BELLE Collab.) REFID=51012
MIYAZAKI	06A	PL B639 159	Y. Miyazaki <i>et al.</i>	(BELLE Collab.) REFID=51263
PDG	06	JPG 33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.) REFID=51004
YUSA	06	PL B640 138	Y. Yusa <i>et al.</i>	(BELLE Collab.) REFID=51378
ARMS	05	PRL 94 241802	K. Arms <i>et al.</i>	(CLEO Collab.) REFID=50661
AUBERT,B	05A	PRL 95 041802	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=50686
AUBERT,B	05F	PR D72 012003	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=50705
AUBERT,B	05W	PR D72 072001	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=50899
AUBERT,BE	05D	PRL 95 191801	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=50949
ENARI	05	PL B622 218	Y. Enari <i>et al.</i>	(BELLE Collab.) REFID=50565
HAYASAKA	05	PL B613 20	K. Hayasaka <i>et al.</i>	(BELLE Collab.) REFID=50547
SCHAEL	05C	PRPL 421 191	S. Schael <i>et al.</i>	(ALEPH Collab.) REFID=50845
ABBIENDI	04J	EPJ C35 437	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=49968
ABDALLAH	04K	EPJ C35 159	J. Abdallah <i>et al.</i>	(DELPHI Collab.) REFID=49970
ABDALLAH	04T	EPJ C36 283	J. Abdallah <i>et al.</i>	(DELPHI Collab.) REFID=50145
ABE	04B	PRL 92 171802	K. Abe <i>et al.</i>	(BELLE Collab.) REFID=49938
ACHARD	04G	PL B585 53	P. Achard <i>et al.</i>	(L3 Collab.) REFID=50105
AUBERT	04J	PRL 92 121801	B. Aubert <i>et al.</i>	(BABAR Collab.) REFID=49925
ENARI	04	PRL 93 081803	Y. Enari <i>et al.</i>	(BELLE Collab.) REFID=50073
PDG	04	PL B592 1	S. Eidelman <i>et al.</i>	(PDG Collab.) REFID=49653
YUSA	04	PL B589 103	Y. Yusa <i>et al.</i>	(BELLE Collab.) REFID=49905
ABBIENDI	03	PL B551 35	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=49150
BRIERE	03	PRD 90 181802	R. A. Briere <i>et al.</i>	(CLEO Collab.) REFID=49360
HEISTER	03F	EPJ C30 291	A. Heister <i>et al.</i>	(ALEPH Collab.) REFID=49552
INAMI	03	PL B551 16	K. Inami <i>et al.</i>	(BELLE Collab.) REFID=49149
CHEN	02C	PR D66 071101	S. Chen <i>et al.</i>	(CLEO Collab.) REFID=49058
REGAN	02	PRL 88 071805	B.C. Regan <i>et al.</i>	REFID=48608
ABBIENDI	01J	EPJ C19 653	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=48146
ABREU	01M	EPJ C20 617	P. Abreu <i>et al.</i>	(DELPHI Collab.) REFID=48198
ACCIARRI	01F	PL B507 47	M. Acciarri <i>et al.</i>	(L3 Collab.) REFID=48143
ACHARD	01D	PL B519 189	P. Achard <i>et al.</i>	(L3 Collab.) REFID=48384
ANASTASSOV	01	PRL 86 4467	A. Anastassov <i>et al.</i>	(CLEO Collab.) REFID=48124
HEISTER	01E	EPJ C22 217	A. Heister <i>et al.</i>	(ALEPH Collab.) REFID=48509
ABBIENDI	00A	PL B492 23	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=47796
ABBIENDI	00C	EPJ C13 213	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=47440
ABBIENDI	00D	EPJ C13 197	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=47464
ABREU	00L	EPJ C16 229	P. Abreu <i>et al.</i>	(DELPHI Collab.) REFID=47514
ACCIARRI	00B	PL B479 67	M. Acciarri <i>et al.</i>	(L3 Collab.) REFID=47461
AHMED	00	PR D61 071101	S. Ahmed <i>et al.</i>	(CLEO Collab.) REFID=47462
ALBRECHT	00	PL B485 37	H. Albrecht <i>et al.</i>	(ARGUS Collab.) REFID=47715
ASNER	00	PR D61 012002	D.M. Asner <i>et al.</i>	(CLEO Collab.) REFID=47339
ASNER	00B	PR D62 072006	D.M. Asner <i>et al.</i>	(CLEO Collab.) REFID=47766
BERGFELD	00	PRL 84 830	T. Bergfeld <i>et al.</i>	(CLEO Collab.) REFID=47463
BROWDER	00	PR D61 052004	T.E. Browder <i>et al.</i>	(CLEO Collab.) REFID=47466
EDWARDS	00A	PR D61 072003	K.W. Edwards <i>et al.</i>	(CLEO Collab.) REFID=47465
GONZALEZ-S...	00	NP B582 3	G.A. Gonzalez-Sprinberg <i>et al.</i>	REFID=47805
ABBIENDI	99H	PL B447 134	G. Abbiendi <i>et al.</i>	(OPAL Collab.) REFID=46716
ABREU	99X	EPJ C10 201	P. Abreu <i>et al.</i>	(DELPHI Collab.) REFID=47302
ACKERSTAFF	99D	EPJ C8 3	K. Ackerstaff <i>et al.</i>	(OPAL Collab.) REFID=47012
ACKERSTAFF	99E	EPJ C8 183	K. Ackerstaff <i>et al.</i>	(OPAL Collab.) REFID=47013
BARATE	99K	EPJ C10 1	R. Barate <i>et al.</i>	(ALEPH Collab.) REFID=47181
BARATE	99R	EPJ C11 599	R. Barate <i>et al.</i>	(ALEPH Collab.) REFID=47366
BISHAI	99	PRL 82 281	M. Bishai <i>et al.</i>	(CLEO Collab.) REFID=46549
GODANG	99	PR D59 091303	R. Godang <i>et al.</i>	(CLEO Collab.) REFID=46998
RICHICHI	99	PR D60 112002	S.J. Richichi <i>et al.</i>	(CLEO Collab.) REFID=47268
ACCIARRI	98C	PL B426 207	M. Acciarri <i>et al.</i>	(L3 Collab.) REFID=45945

ACCIARRI	98E	PL B434 169	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=45948
ACCIARRI	98R	PL B438 405	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=46502
ACKERSTAFF	98M	EPJ C4 193	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)	REFID=45944
ACKERSTAFF	98N	PL B431 188	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)	REFID=45951
ALBRECHT	98	PL B431 179	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=46067
BARATE	98	EPJ C1 65	R. Barate <i>et al.</i>	(ALEPH Collab.)	REFID=45809
BARATE	98E	EPJ C4 29	R. Barate <i>et al.</i>	(ALEPH Collab.)	REFID=45917
BLISS	98	PR D57 5903	D.W. Bliss <i>et al.</i>	(CLEO Collab.)	REFID=45943
ABE	97O	PRL 78 4691	K. Abe <i>et al.</i>	(SLD Collab.)	REFID=45461
ACKERSTAFF	97J	PL B404 213	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)	REFID=45455
ACKERSTAFF	97L	ZPHY C74 403	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)	REFID=45486
ACKERSTAFF	97R	ZPHY C75 593	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)	REFID=45616
ALEXANDER	97F	PR D56 5320	J.P. Alexander <i>et al.</i>	(CLEO Collab.)	REFID=45677
AMMAR	97B	PRL 78 4686	R. Ammar <i>et al.</i>	(CLEO Collab.)	REFID=45460
ANASTASSOV	97	PR D55 2559	A. Anastassov <i>et al.</i>	(CLEO Collab.)	REFID=45273
Also		PR D58 119903 (erratum)	A. Anastassov <i>et al.</i>	(CLEO Collab.)	REFID=46530
ANDERSON	97	PRL 79 3814	S. Anderson <i>et al.</i>	(CLEO Collab.)	REFID=45718
AVERY	97	PR D55 R1119	P. Avery <i>et al.</i>	(CLEO Collab.)	REFID=45216
BARATE	97I	ZPHY C74 387	R. Barate <i>et al.</i>	(ALEPH Collab.)	REFID=45484
BARATE	97R	PL B414 362	R. Barate <i>et al.</i>	(ALEPH Collab.)	REFID=45795
BERGFELD	97	PRL 79 2406	T. Bergfeld <i>et al.</i>	(CLEO Collab.)	REFID=45695
BONVICINI	97	PRL 79 1221	G. Bonvicini <i>et al.</i>	(CLEO Collab.)	REFID=45591
BUSKULIC	97C	ZPHY C74 263	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=45444
COAN	97	PR D55 7291	T.E. Coan <i>et al.</i>	(CLEO Collab.)	REFID=45496
EDWARDS	97	PR D55 R3919	K.W. Edwards <i>et al.</i>	(CLEO Collab.)	REFID=45217
EDWARDS	97B	PR D56 R5297	K.W. Edwards <i>et al.</i>	(CLEO Collab.)	REFID=45674
ESCRIBANO	97	PL B395 369	R. Escribano, E. Masso	(BARC, PARIT)	REFID=45261
ABREU	96B	PL B365 448	P. Abreu <i>et al.</i>	(DELPHI Collab.)	REFID=44662
ACCIARRI	96H	PL B377 313	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=44864
ACCIARRI	96K	PL B389 187	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=44966
ALAM	96	PRL 76 2637	M.S. Alam <i>et al.</i>	(CLEO Collab.)	REFID=44664
ALBRECHT	96E	PRPL 276 223	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44953
ALEXANDER	96D	PL B369 163	G. Alexander <i>et al.</i>	(OPAL Collab.)	REFID=44663
ALEXANDER	96E	PL B374 341	G. Alexander <i>et al.</i>	(OPAL Collab.)	REFID=44666
ALEXANDER	96S	PL B388 437	G. Alexander <i>et al.</i>	(OPAL Collab.)	REFID=44962
BAI	96	PR D53 20	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=44698
BALEST	96	PL B388 402	R. Balest <i>et al.</i>	(CLEO Collab.)	REFID=44960
BARTELT	96	PRL 76 4119	J.E. Bartelt <i>et al.</i>	(CLEO Collab.)	REFID=44665
BUSKULIC	96	ZPHY C70 579	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=44588
BUSKULIC	96C	ZPHY C70 561	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=44658
COAN	96	PR D53 6037	T.E. Coan <i>et al.</i>	(CLEO Collab.)	REFID=44667
ABE	95Y	PR D52 4828	K. Abe <i>et al.</i>	(SLD Collab.)	REFID=44479
ABREU	95T	PL B357 715	P. Abreu <i>et al.</i>	(DELPHI Collab.)	REFID=44470
ABREU	95U	PL B359 411	P. Abreu <i>et al.</i>	(DELPHI Collab.)	REFID=44477
ACCIARRI	95	PL B345 93	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=44125
ACCIARRI	95F	PL B352 487	M. Acciarri <i>et al.</i>	(L3 Collab.)	REFID=44280
AKERS	95F	ZPHY C66 31	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=44183
AKERS	95I	ZPHY C66 543	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=44288
AKERS	95P	ZPHY C67 45	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=44366
AKERS	95Y	ZPHY C68 555	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=44539
ALBRECHT	95	PL B341 441	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44114
ALBRECHT	95C	PL B349 576	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44267
ALBRECHT	95G	ZPHY C68 25	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44461
ALBRECHT	95H	ZPHY C68 215	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44462
BALEST	95C	PRL 75 3809	R. Balest <i>et al.</i>	(CLEO Collab.)	REFID=44557
BERNABEU	95	NP B436 474	J. Bernabeu <i>et al.</i>		REFID=48066
BUSKULIC	95C	PL B346 371	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=44206
BUSKULIC	95D	PL B346 379	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=44207
Also		PL B363 265 (erratum)	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=44559
ABREU	94K	PL B334 435	P. Abreu <i>et al.</i>	(DELPHI Collab.)	REFID=43958
AKERS	94E	PL B328 207	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=43802
AKERS	94G	PL B339 278	R. Akers <i>et al.</i>	(OPAL Collab.)	REFID=43920
ALBRECHT	94E	PL B337 383	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44017
ARTUSO	94	PRL 72 3762	M. Artuso <i>et al.</i>	(CLEO Collab.)	REFID=43795
BARTELT	94	PRL 73 1890	J.E. Bartelt <i>et al.</i>	(CLEO Collab.)	REFID=43919
BATTLE	94	PRL 73 1079	M. Battle <i>et al.</i>	(CLEO Collab.)	REFID=43918
BAUER	94	PR D50 R13	D.A. Bauer <i>et al.</i>	(TPC/2gamma Collab.)	REFID=43861
BUSKULIC	94D	PL B321 168	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=43885
BUSKULIC	94E	PL B332 209	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=43898
BUSKULIC	94F	PL B332 219	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=43899
GIBAUT	94B	PRL 73 934	D. Gibaut <i>et al.</i>	(CLEO Collab.)	REFID=43917
ADRIANI	93M	PRPL 236 1	O. Adriani <i>et al.</i>	(L3 Collab.)	REFID=43644
ALBRECHT	93C	ZPHY C58 61	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=43310
ALBRECHT	93G	PL B316 608	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=43627
BALEST	93	PR D47 R3671	R. Balest <i>et al.</i>	(CLEO Collab.)	REFID=43373
BEAN	93	PRL 70 138	A. Bean <i>et al.</i>	(CLEO Collab.)	REFID=43203
BORTOLETTO	93	PRL 71 1791	D. Bortolotto <i>et al.</i>	(CLEO Collab.)	REFID=43527
ESCRIBANO	93	PL B301 419	R. Escribano, E. Masso	(BARC)	REFID=43289
PROCARIO	93	PRL 70 1207	M. Procario <i>et al.</i>	(CLEO Collab.)	REFID=43211
ABREU	92N	ZPHY C55 555	P. Abreu <i>et al.</i>	(DELPHI Collab.)	REFID=42204
ACTON	92F	PL B281 405	D.P. Acton <i>et al.</i>	(OPAL Collab.)	REFID=42082
ACTON	92H	PL B288 373	P.D. Acton <i>et al.</i>	(OPAL Collab.)	REFID=42152
AKERIB	92	PRL 69 3610	D.S. Akerib <i>et al.</i>	(CLEO Collab.)	REFID=43125
Also		PRL 71 3395 (erratum)	D.S. Akerib <i>et al.</i>	(CLEO Collab.)	REFID=43574
ALBRECHT	92D	ZPHY C53 367	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=41955
ALBRECHT	92K	ZPHY C55 179	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=42198
ALBRECHT	92M	PL B292 221	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=42211
ALBRECHT	92Q	ZPHY C56 339	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=43150
AMMAR	92	PR D45 3976	R. Ammar <i>et al.</i>	(CLEO Collab.)	REFID=41904
ARTUSO	92	PRL 69 3278	M. Artuso <i>et al.</i>	(CLEO Collab.)	REFID=43120
BAI	92	PRL 69 3021	J.Z. Bai <i>et al.</i>	(BES Collab.)	REFID=43117
BATTLE	92	PL B291 488	M. Battle <i>et al.</i>	(CLEO Collab.)	REFID=42208
BUSKULIC	92J	PL B297 459	D. Buskulic <i>et al.</i>	(ALEPH Collab.)	REFID=43222
DECAMP	92C	ZPHY C54 211	D. Decamp <i>et al.</i>	(ALEPH Collab.)	REFID=41902

ADEVA	91F	PL B265 451	B. Adeva <i>et al.</i>	(L3 Collab.)	REFID=41610
ALBRECHT	91D	PL B260 259	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=41529
ALEXANDER	91D	PL B266 201	G. Alexander <i>et al.</i>	(OPAL Collab.)	REFID=41613
ANTREASYAN	91	PL B259 216	D. Antreasyan <i>et al.</i>	(Crystal Ball Collab.)	REFID=41486
GRIFOLS	91	PL B255 611	J.A. Grifols, A. Mendez	(BARC)	REFID=41442
ABACHI	90	PR D41 1414	S. Abachi <i>et al.</i>	(HRS Collab.)	REFID=41243
ALBRECHT	90E	PL B246 278	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=41335
ALBRECHT	90I	PL B250 164	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=41414
BEHREND	90	ZPHY C46 537	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=40983
BOVCOCK	90	PR D41 805	T.J.V. Bowcock <i>et al.</i>	(CLEO Collab.)	REFID=41239
DELAGUILA	90	PL B252 116	F. del Aguila, M. Sher	(BARC, WILL)	REFID=41420
GOLDBERG	90	PL B251 223	M. Goldberg <i>et al.</i>	(CLEO Collab.)	REFID=41457
WU	90	PR D41 2339	D.Y. Wu <i>et al.</i>	(Mark II Collab.)	REFID=41246
ABACHI	89B	PR D40 902	S. Abachi <i>et al.</i>	(HRS Collab.)	REFID=40847
BEHREND	89B	PL B222 163	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=40817
JANSSEN	89	PL B228 273	H. Janssen <i>et al.</i>	(Crystal Ball Collab.)	REFID=40827
KLEINWORT	89	ZPHY C42 7	C. Kleinwort <i>et al.</i>	(JADE Collab.)	REFID=40854
ADEVA	88	PR D38 2665	B. Adeva <i>et al.</i>	(Mark-J Collab.)	REFID=40686
ALBRECHT	88B	PL B202 149	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=40506
ALBRECHT	88I	ZPHY C41 1	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=40861
ALBRECHT	88M	ZPHY C41 405	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=40862
AMIDEI	88	PR D37 1750	D. Amidei <i>et al.</i>	(Mark II Collab.)	REFID=40433
BEHREND	88	PL B200 226	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=40441
BRAUNSCH... 88C	ZPHY C39 331	W. Braunschweig <i>et al.</i>	(TASSO Collab.)	REFID=40696	
KEH	88	PL B212 123	S. Keh <i>et al.</i>	(Crystal Ball Collab.)	REFID=40655
TSCHIRHART	88	PL B205 407	R. Tschirhart <i>et al.</i>	(HRS Collab.)	REFID=40640
ABACHI	87B	PL B197 291	S. Abachi <i>et al.</i>	(HRS Collab.)	REFID=40432
ABACHI	87C	PRL 59 2519	S. Abachi <i>et al.</i>	(HRS Collab.)	REFID=40439
ADLER	87B	PRL 59 1527	J. Adler <i>et al.</i>	(Mark III Collab.)	REFID=40431
AIHARA	87B	PR D35 1553	H. Aihara <i>et al.</i>	(TPC Collab.)	REFID=40423
AIHARA	87C	PRL 59 751	H. Aihara <i>et al.</i>	(TPC Collab.)	REFID=40428
ALBRECHT	87I	PL B185 223	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=40418
ALBRECHT	87P	PL B199 580	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=40440
BAND	87	PL B198 297	H.R. Band <i>et al.</i>	(MAC Collab.)	REFID=40263
BAND	87B	PRL 59 415	H.R. Band <i>et al.</i>	(MAC Collab.)	REFID=40427
BARINGER	87	PRL 59 1993	P. Baringer <i>et al.</i>	(CLEO Collab.)	REFID=40436
BEBEK	87C	PR D36 690	C. Bebek <i>et al.</i>	(CLEO Collab.)	REFID=40429
BURCHAT	87	PR D35 27	P.R. Burchat <i>et al.</i>	(Mark II Collab.)	REFID=40422
BYLSMA	87	PR D35 2269	B.G. Bylsma <i>et al.</i>	(HRS Collab.)	REFID=40424
COFFMAN	87	PR D36 2185	D.M. Coffman <i>et al.</i>	(Mark III Collab.)	REFID=40430
DERRICK	87	PL B189 260	M. Derrick <i>et al.</i>	(HRS Collab.)	REFID=40421
FORD	87	PR D35 408	W.T. Ford <i>et al.</i>	(MAC Collab.)	REFID=40434
FORD	87B	PR D36 1971	W.T. Ford <i>et al.</i>	(MAC Collab.)	REFID=40438
GAN	87	PRL 59 411	K.K. Gan <i>et al.</i>	(Mark II Collab.)	REFID=40426
GAN	87B	PL B197 561	K.K. Gan <i>et al.</i>	(Mark II Collab.)	REFID=40437
AIHARA	86E	PRL 57 1836	H. Aihara <i>et al.</i>	(TPC Collab.)	REFID=40420
BARTEL	86D	PL B182 216	W. Bartel <i>et al.</i>	(JADE Collab.)	REFID=40417
PDG	86	PL 170B 1	M. Aguilar-Benitez <i>et al.</i>	(CERN, CIT+)	REFID=40122
RUCKSTUHL	86	PRL 56 2132	W. Ruckstuhl <i>et al.</i>	(DELCO Collab.)	REFID=10349
SCHMIDKE	86	PRL 57 527	W.B. Schmidke <i>et al.</i>	(Mark II Collab.)	REFID=10350
YELTON	86	PRL 56 812	J.M. Yelton <i>et al.</i>	(Mark II Collab.)	REFID=10351
ALTHOFF	85	ZPHY C26 521	M. Althoff <i>et al.</i>	(TASSO Collab.)	REFID=10339
ASH	85B	PRL 55 2118	W.W. Ash <i>et al.</i>	(MAC Collab.)	REFID=10340
BALTRUSAIT... 85	PRL 55 1842	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)	REFID=10341	
BARTEL	85F	PL 161B 188	W. Bartel <i>et al.</i>	(JADE Collab.)	REFID=10342
BEHRENDS	85	PR D32 2468	S. Behrends <i>et al.</i>	(CLEO Collab.)	REFID=10343
BELTRAMI	85	PRL 54 1775	I. Beltrami <i>et al.</i>	(HRS Collab.)	REFID=10344
BERGER	85	ZPHY C28 1	C. Berger <i>et al.</i>	(PLUTO Collab.)	REFID=10345
BURCHAT	85	PRL 54 2489	P.R. Burchat <i>et al.</i>	(Mark II Collab.)	REFID=10290
FERNANDEZ	85	PRL 54 1624	E. Fernandez <i>et al.</i>	(MAC Collab.)	REFID=10347
MILLS	85	PRL 54 624	G.B. Mills <i>et al.</i>	(DELCO Collab.)	REFID=10292
AIHARA	84C	PR D30 2436	H. Aihara <i>et al.</i>	(TPC Collab.)	REFID=10334
BEHREND	84	ZPHY C23 103	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=10336
MILLS	84	PRL 52 1944	G.B. Mills <i>et al.</i>	(DELCO Collab.)	REFID=10337
BEHREND	83C	PL 127B 270	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=10331
SILVERMAN	83	PR D27 1196	D.J. Silverman, G.L. Shaw	(UCI)	REFID=43784
BEHREND	82	PL 114B 282	H.J. Behrend <i>et al.</i>	(CELLO Collab.)	REFID=10324
BLOCKER	82B	PRL 48 1586	C.A. Blocker <i>et al.</i>	(Mark II Collab.)	REFID=10326
BLOCKER	82D	PL 109B 119	C.A. Blocker <i>et al.</i>	(Mark II Collab.)	REFID=10325
FELDMAN	82	PRL 48 66	G.J. Feldman <i>et al.</i>	(Mark II Collab.)	REFID=10328
HAYES	82	PR D25 2869	K.G. Hayes <i>et al.</i>	(Mark II Collab.)	REFID=10330
BERGER	81B	PL 99B 499	C. Berger <i>et al.</i>	(PLUTO Collab.)	REFID=10322
DORFAN	81	PRL 46 215	J.M. Dorfan <i>et al.</i>	(Mark II Collab.)	REFID=10323
BRANDELIK	80	PL 92B 199	R. Brandelik <i>et al.</i>	(TASSO Collab.)	REFID=10318
ZHOLENZ	80	PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)	REFID=10320
Also		SJNP 34 814	A.A. Zholents <i>et al.</i>	(NOVO)	REFID=10321
BACINO	79B	Translated from YAF 34	1471.		
KIRKBY	79	PR D42 749	W.J. Bacino <i>et al.</i>	(DELCO Collab.)	REFID=10316
		SLAC-PUB-2419	J. Kirkby	(SLAC)	REFID=10283
Batavia Lepton Photon Conference.					
BACINO	78B	PR D41 13	W.J. Bacino <i>et al.</i>	(DELCO Collab.)	REFID=10304
Also		Tokyo Conf. 249	J. Kirz	(STON)	REFID=10305
Also		PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)	REFID=10320
BRANDELIK	78	PL 73B 109	R. Brandelik <i>et al.</i>	(DASP Collab.)	REFID=10280
FELDMAN	78	Tokyo Conf. 777	G.J. Feldman	(SLAC)	REFID=10355
JAROS	78	PRL 40 1120	J. Jaros <i>et al.</i>	(LGW Collab.)	REFID=10310
PERL	75	PRL 35 1489	M.L. Perl <i>et al.</i>	(LBL, SLAC)	REFID=10294

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GENTILE	96	PRPL 274 287	S. Gentile, M. Pohl	(ROMAI, ETH)	REFID=44936
WEINSTEIN	93	ARNPS 43 457	A.J. Weinstein, R. Stroynowski	(CIT, SMU)	REFID=43649
PERL	92	RPP 55 653	M.L. Perl	(SLAC)	REFID=41901
PICH	90	MPL A5 1995	A. Pich	(VALE)	REFID=41378
BARISH	88	PRPL 157 1	B.C. Barish, R. Stroynowski	(CIT)	REFID=40321
GAN	88	IJMP A3 531	K.K. Gan, M.L. Perl	(SLAC)	REFID=40708
HAYES	88	PR D38 3351	K.G. Hayes, M.L. Perl	(SLAC)	REFID=40689
PERL	80	ARNPS 30 299	M.L. Perl	(SLAC)	REFID=10359
